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(b) If you are not directly engaged in war production work, check up on the proper rating for your repair and maintenance requirements, because effective after May 4, a new order, amendment No. 4, supplementary to General Preference Order M-21-b, establishes closer control and greater limitations on the distribution of steel.

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essary. This will preclude the possibility of further correspondence that might delay shipment, or prior sale of material.

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We are most anxious to help you with every problem of steel procurement or application, during these critical days! Do not hesitate to keep closely in touch with us.

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THE IRON AGE

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JUNE 18, 1942

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ESTABLISHED 1855



Help Yourself to More Steel

THIS editorial is especially intended for "top executives" in the steel using industries. But anyone else is welcome to read it.

I am addressing the "brass hats" on this occasion, because they are the boys who shape the overall policies of their companies. They have the say, for example, with regard to putting their companies into a new line of business. And I am going to suggest just that to them.

Gentlemen, I urge you to go into the steel producing business. You can do it with the expenditure of very little capital indeed.

You will not need to build 5 million dollar blast furnaces and 20 million dollar continuous mills to go into the steel business. You can go into it with what you have already got in your own plant. And if enough of you go into this venture in a cooperative spirit, it will go far toward solving your problem of steel shortages.

I am referring to the reclamation of scrap in your company's plant or plants.

Of course, you now have a scrap recovery system in operation. It's a matter of routine. You have to shovel away the chips—no thanks to you—or be snowed under in view of the tremendous production drive that you are now putting on.

But that's routine, boys, and here's where you brass hats come in. You have to initiate the exceptions. And we need an exceptional drive for more scrap if you are to have more steel.

There is no "baloney" about that. Scrap reserves today are running behind collections. And you know what that signifies with respect to future steel production.

For years and years, under the good neighbor policy, we have been shipping millions of tons of scrap to Japan. With it, she has built her navy, her tanks and her guns that reduced Corregidor and captured the Philippines.

So now, brass hat brethren, it is up to you to do a little something extra to offset our kindness to Japan. And you can do it.

Those machines, for example, that you have moved out into the yard to make room for new machines for munition making. Those old machines won't go back into your production line after the war. They will be rusty and obsolete. After-the-war production will require a new tool-up. So into the scrap pile with them.

Those die sets that you have been carefully preserving in order to accommodate your 1935 and previous customers are in the same category. You can do yourselves and Uncle Sam a favor by chucking them into the scrap pile. The new America that we will build after this war will have no room for old models.

It takes an order from a "brass hat" to initiate anything of this kind. That is why I am addressing you big boys particularly. Help yourself and Uncle Sam to some more steel.

J. H. Van Dusen

Urgent

An Open Letter to Executives on the Subject of the Critical Scrap Shortage

INLAND STEEL COMPANY CHICAGO

OFFICE OF THE PRESIDENT

Gentlemen:

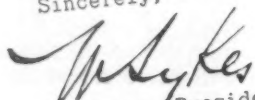
Much has been said and done about the great need for more scrap to keep the steel mills running, but do you men who have control in your various plants and factories realize the gravity of the situation?

The steel industry is hoping to produce 88 million tons or more during 1942. To make this amount of steel will require a minimum of 30 to 40 million tons of scrap iron. We used to figure about 55% scrap and 45% pig iron. Now we are using less scrap and more pig iron, but with blast furnaces running 24 hours a day producing all the pig iron possible the only way we can increase our production is to get more scrap. We must not only get enough scrap to carry on this summer, but we must build up a back-log that will carry us through the winter.

Sometime ago we made a drive to clean up scrap on our own plant and secured a substantial tonnage. However, I was not satisfied and six months later authorized divisional managers to junk everything that they did not absolutely need in the operation of the business. This second check produced more than double the first cleanup.

I tell this story because I believe the same situation may exist in your plant. In time of war it is inconceivable to me that anyone with the authority to scrap unused equipment, dies, jigs, forms, moulds, etc., would not do so at once. Our boys at the front need steel with which to fight, need steel for protection. Your scrap steel will help save their lives and help win this war more quickly. So I urge you not to hold back. Scrap it now—tomorrow may be too late.

Sincerely,



W. Sykes, President
Inland Steel Company

INLAND STEEL CO.

Hydro-Press Forming With Rubber Platens

By T. H. HAZLETT

and

WILLIAM SCHROEDER

Research Engineers, Lockheed Aircraft
Corp., Burbank, Cal.

ONE of the principal methods of forming sheet metal parts in the aircraft industry is by means of a single acting press, making use of a comparatively hard rubber blanket confined in the upper platen and a male form block on the lower table. This method is made possible by the comparatively low pressures required to form aluminum alloys. The economic advantage of the process is evident when the relative cost of punch press dies is compared with that of simple form blocks that require no careful mating of component parts. An additional advantage arises from this simplicity which permits the use of semi-skilled mechanics for the work.

The importance of this forming technique has kept pace with the advent of high production rates that are required at the present time. In fact, production of 45,000 parts can be made on one press in a single day. The economic factors that originally fostered this process still remain the same today, that is, the variety of component parts required per airframe is still very large and the total number of units produced relatively small, when the aircraft industry is compared with the automotive industry.

Mass production requires interchangeability, necessitating close tolerances and uniformity of parts. However, it has long been known that parts formed with rubber in the hydro-press exhibit certain ap-

... Herein are correlated experimental data on the variables involved in the forming of metal with rubber in the hydro-press. There is thus established a basis for calculating and controlling spring-back in materials of hard temper, the result being greater accuracy in parts and increased production of aircraft.

parently random variations that are particularly evidenced in differences in the amount by which the flanges bent over the form blocks "spring back" when the forming pressure is released. Such variation has caused little difficulty when materials of soft temper, such as 24SO annealed aluminum alloy, have been used, because the total amount of angular springback has been small and any divergences could readily be removed by hand straightening. However, with the increasing trend toward formation of materials in the harder tempers, such as 24ST aluminum alloys, springback has become a much more important factor and divergences therein have caused more difficulty because they are not readily correctible by hand work.

An empirical study was made to determine statistical mean values

of springback and limits of variation therein.⁵ It was learned that for straight flanges in 24ST Alclad material, tolerances of ± 2 deg. could be maintained on angular springback if all factors in press operation were kept within certain bounds; but that if any great deviation should occur in one or more of these factors, springback results would become widely divergent. It was therefore deemed worthwhile to make a more careful study to determine the nature of the variables in press operation that affect springback, and the relative magnitudes and importance of these variables.

Since the work had to be done on one particular press, it is recognized that results, quantitatively, may not be exactly applicable to other presses and other operating

LAST of a series of four articles on IMPROVED AIRCRAFT FABRICATING TECHNIQUES developed by Lockheed Aircraft Corp. The preceding articles dealt with "Drawing Dies for Airframe Stampings," "Stretch-Forming Contoured Sheet Metal Aircraft Parts," and "Forming Convex Flanges and Joggles."



ABOVE
FIG. 1—A 4500-ton
Watson - Stillman
hydro-press in oper-
ation.

techniques. However, the very act of listing the variables and showing the rather surprising magnitude of their effect on one press may prove helpful to others in making similar studies on their own equipment.

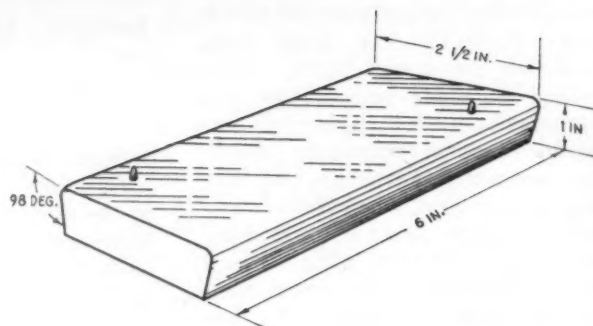
Method of Investigation

Two basic methods of investigation were followed: (1) The springback occurring in typical straight flanges of 24ST Alclad material was measured as a function of such variables as press load, rubber hardness, position of part in the press, and proximity of other form blocks, and, (2) since this study indicated that variations in localized pressure *at the part* might be the key to all the phenomena observed, the pressure itself was measured by the use of strain gages embedded in typical form blocks.

The press was a Watson-Stillman of 4500-ton capacity, having a table area of 5580 sq. in. A view of this press operation is shown in Fig. 1. Under normal conditions, the applied load in this press is 3500 to 3700 tons and rubber of 50 to 70 Shore hardness is used.

Steel form blocks 1 in. high, similar to the one shown in Fig. 2, were used for all tests. The sides were

RIGHT
FIG. 2—A test
form block.



undercut as shown, forming a 98-deg. external angle with the top of the block. This enables 24ST Alclad specimens to be formed with approximately 90-deg. angle flanges. Since the thickness range from 0.020 to 0.064 in. is now in most common use in aircraft parts, 0.032 in. and 0.064 in. materials were selected as representative for these tests.

This investigation of springback angle variation included studies of the effect of such factors as: Applied press load, proximity of other objects on the table, rubber hardness, form block height, and certain irregularities inherent in hand-made form block radii. Each value shown in the following discussion represents an average of results from six different specimens tested under similar conditions. Good consistency was rea-

lized since the maximum observed variation within each group of six specimens was only 3 per cent.

Effect of Applied Press Load:

The table of the press was cleared except for the test block which was located at the geometric center, and the applied press load was varied from 1000 to 3500 tons. The results are shown in Fig. 3.

Variation in press load was found to have negligible effect on the springback angle in the case of 0.032 in. material for either a $\frac{1}{4}$ in. or $\frac{1}{8}$ in. bend radii. However, the springback angle of 0.064 in. material decreased materially with increasing press load, approaching for a $\frac{1}{8}$ in. radius bend a constant value of about 7 deg. at 3500 tons or more. For a $\frac{1}{4}$ in. radius bend such a constant value was not

reached within the load range available.

Effect of Adjacent Objects:

Several metal displacement blocks were placed adjacent to the test block as shown in Fig. 4 and the applied press load was varied from 1000 to 3500 tons. Bend radius was $\frac{1}{4}$ in. in all cases. The displacement blocks were approximately $5 \times 12 \times 3\frac{1}{2}$ in. high and had well rounded corners.

Fig. 5 shows the resulting curves of springback vs. press load, indicated by the dashed lines, and compared with the curves, shown solid for the case with the table empty, taken from Fig. 3. Study of Fig. 5 reveals that a decided advantage was gained from the presence of the displacement block when 0.064 in. material was formed. The variation in springback, as indicated by the slope of the curve, was reduced so that the springback angle remained virtually constant even with varied press loads.

The effect of the displacement block on the results with 0.32 in.

With the table empty, the change from 50 to 70 Shore hardness rubber (solid curves) increased the springback materially and raised the load at which it approached a constant value. With displacement blocks present, the 70 Shore hardness rubber destroyed to some extent their effect, observed with the softer rubber, in eliminating all variation of springback with press load. In other words, the harder rubber gave less favorable results than the softer.

Effect of Height of Form Block:

The effect of differences in height of form blocks was investigated under the press loads of 3500 tons. With the table cleared except for the test block, which was placed in the center, both 0.032 in. and 0.064 in. materials were bent over a $\frac{1}{8}$ in. radius form block. Blocks 1, 2 and 3 in. high were used, and parts were formed over each under conditions otherwise similar. The effect on springback angle is shown in Fig. 7.

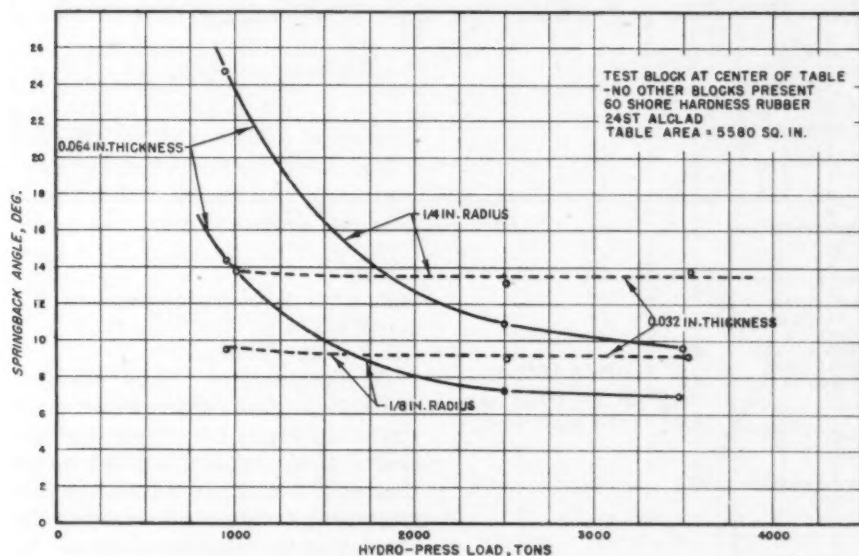
It may be noticed that for both

materials the springback angle decreases with increased height of form block. The average value of springback angle is decreased almost 1 deg. in each case when the height of form block is increased from 1 in. to 3 in.

Effect of Irregular Block Radii:

Since radii are often put on form blocks by rough machining and then polishing by hand, it was desirable to determine the effect on springback angle of the small irregularities that result from this method of preparation. Two similar form blocks having a $\frac{1}{8}$ in. radius were carefully prepared. They differed only in that one had a "high spot" well within the limits of standard shop technique in making such blocks. Specimens of 0.032 in. material were formed on both blocks under identical press conditions and 3500-ton load. A difference of $1\frac{1}{4}$ deg. in springback angle was observed between the parts coming from the two blocks.

In order to determine the actual pressures exerted on a form block under various table-loading conditions, a pressure gage embodying the electric strain gage principle was constructed. This type of gage has already been in use in the aircraft industry for measuring strains in sections under load tests 1 and 2. The gage consists of a form block, similar to those used in the preceding work, in which are mounted two pressure measuring cartridges; one for indicating the pressure on the top and the other on the side as shown in Fig. 8, part (a). The cartridges consist of aluminum alloy cylinders so placed in the block that their faces are flush with the top and side of the block respectively. To each cylinder is cemented an electric strain gage grid, 3 and 4 as shown in Fig. 8, part (b). A flexible set of electrical leads connects each electric strain gage grid with the neces-



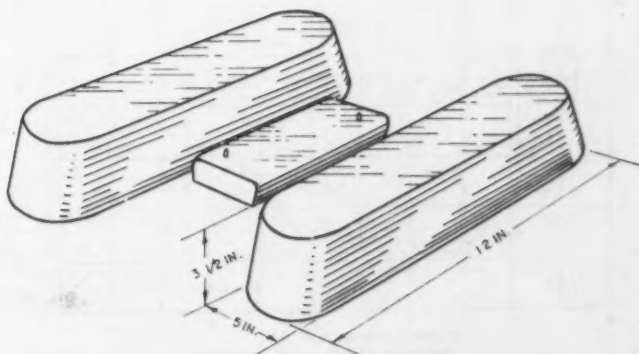
material was slight, because the springback angle had already been reduced to a relatively constant value at comparatively low pressure and further pressure, induced by the displacement block, had no added effect.

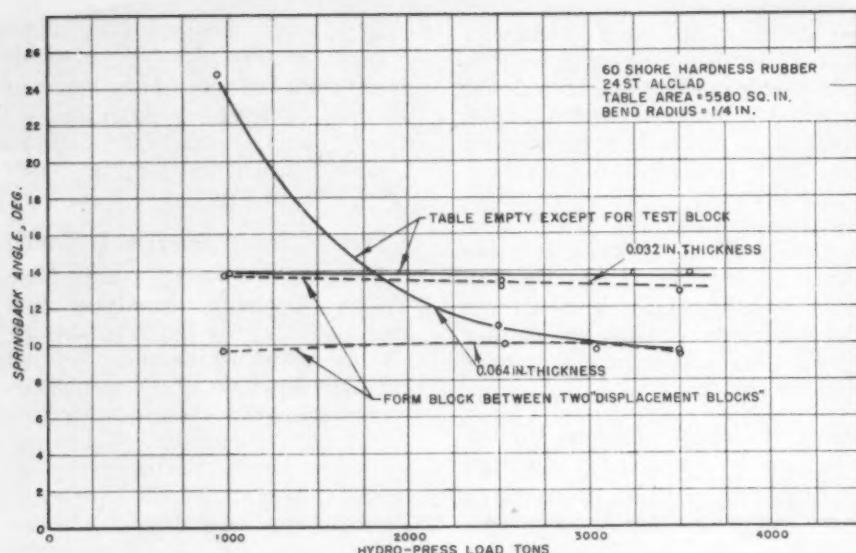
Effect of Rubber Hardness:

The comparative effect of 60 and 70 Shore hardness rubber was also examined. In one case the table was empty; in the other the arrangement shown in Fig. 4 was used at the center of the table. Material thickness was 0.064 in.

ABOVE
FIG. 3—The effect of applied press load.

RIGHT
FIG. 4—Arrangement of form block and displacement blocks.



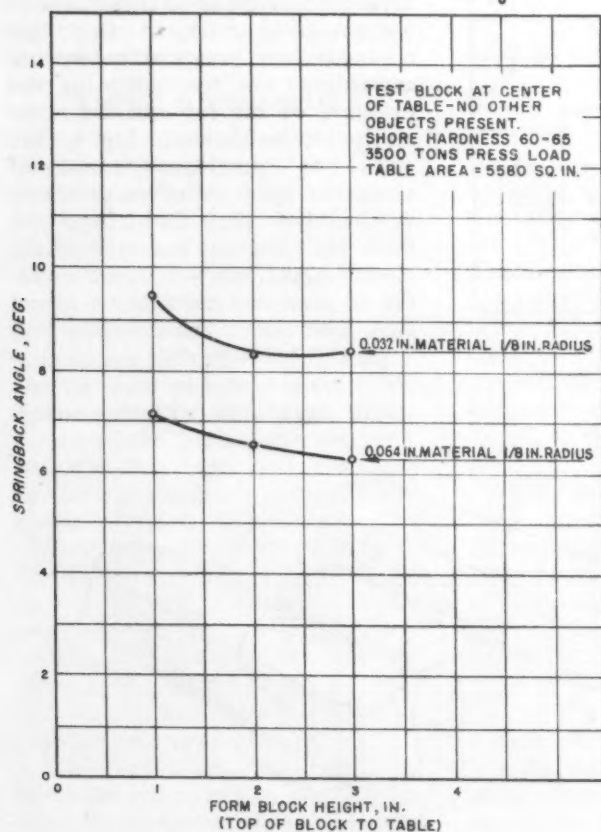


sary bridge-type resistance-measuring circuit. The whole unit is calibrated before and after each series of tests to insure accurate results.

In general, the same basic procedure was used in this survey as in the preceding tests in order that correlations between springback and pressure variation could be made. Both top and side pressures were taken, but only the top pressures are discussed in this article. The side pressures are similar and only slightly lower in all cases.

Pressure Distribution

The pressure distribution over



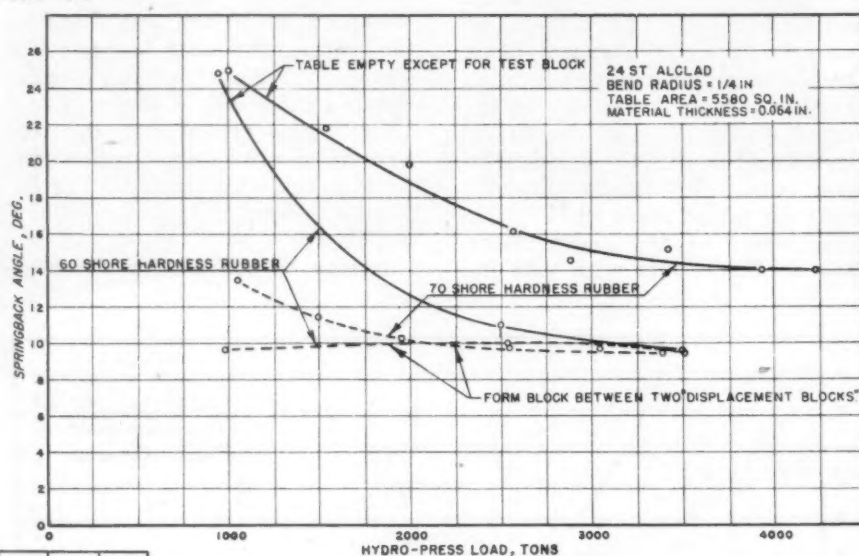
UPPER LEFT
FIG. 5—Effect of table loading.

ABOVE
FIG. 6—Springback vs. hydro-press load effect of rubber hardness.

LEFT
FIG. 7—Springback angle vs. block height.

the surface of the press table was determined with the press operating at 3500-ton load applied over a table that was clear except for the pressure gage. Rubber of a Shore hardness from 60 to 65 was used in the upper platen. The results of the tests are shown graphically in Fig. 9.

Under similar conditions, but with 54 Shore hardness rubber in the upper platen, the pressure distribution on the center line of the table extending from end to end was made. Readings were made at one ft. intervals along the center line; the results being shown in Fig. 10. The rubber platen with lower Shore hardness produced a



somewhat more even pressure distribution than that observed with the harder rubber.

As is indicated, large pressure variations were observed in both tests. In Fig. 9 the pressure at the center of the table was about twice that at the ends. However, the distribution from one side to the other was reasonably uniform.

The variations in pressure from end to end indicated that the rubber was not being restrained as effectively at the ends as at the middle of the table. In order to even out the pressure distribution, several displacement blocks were placed at each end of the table as shown in Fig. 12. The new pressure distribution on the center line is shown in Fig. 10.

The pressure distribution surrounding a displacement block placed adjacent to a part being formed in the press was determined by making measurements about a block placed at the center of the otherwise clear table. The results

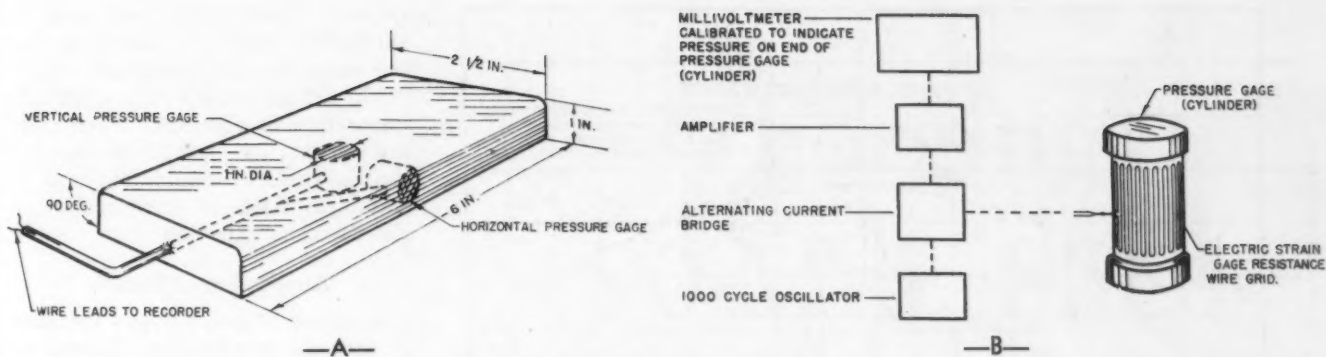


FIG. 8—The pressure gage assembly is shown in part (A) while the details of the gage and the block diagram of the circuit are shown in part (B).

are shown graphically in Fig. 11, one quarter of the table surface being shown in this case.

As seen in Fig. 11, the pressure is relatively high for a considerable distance along the axis perpendicular to the block, while the pressure decreases rapidly along an axis parallel to the length of the block. The pressure boosting effect adjacent to high objects on the table is clearly revealed.

Pressure vs. Block Height

The height of the pressure gage above the table, the latter being empty except for the test block, was varied by raising the block in which it was contained. A 3500-ton load was applied to the press. The increase in pressure achieved by increasing the block height is shown in Table I.

Although quantitative correlation between springback data and pressure distribution is impossible, the results do indicate their qualitative relationships. The differences in springback angle as revealed by the test results described in this article are explained by the variation in pressure on the platen brought about by the several factors herein described. In all cases the springback angle decreased with increased pressure until a constant value of springback was obtained. Beyond that, increased pressure seems to have little effect.

It was evident that consistent springback angles could not be achieved without obtaining, by some means, a constant localized pressure adjacent to the part; or preferably by operating the press at sufficiently high pressures to reach the point where springback becomes constant regardless of further pressure increase.

Pressure-boosting devices, such as increasing the block height and using displacement blocks, are beneficial in equalizing the pressure over the table. They may also be used to a limited extent to produce high pressures over a limited region of the table to form parts from heavy material. However, too many displacement blocks may have a detrimental effect because increase of pressure at one point must be compensated by a balancing de-

crease of pressure somewhere else.

Springback angle measurements clearly indicated that much more consistent results with 24ST material may be obtained by forming flanges with soft rubber. However, other considerations, such as life of the rubber and the necessity of giving support against buckling during the shrinking of convex flanges, requires that some sort of compromise be reached on this point.

Irregularities in form block radii

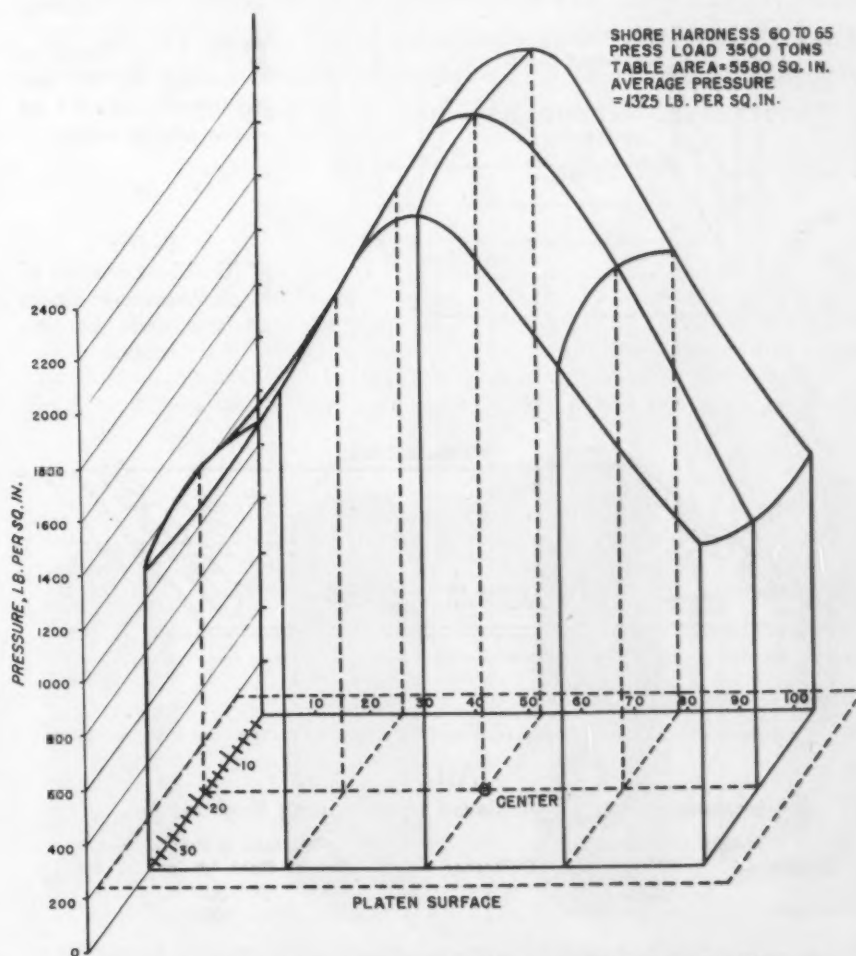
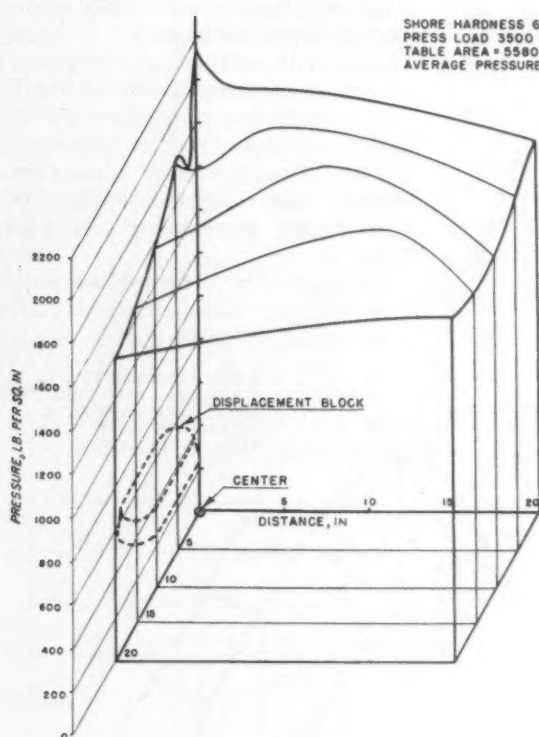
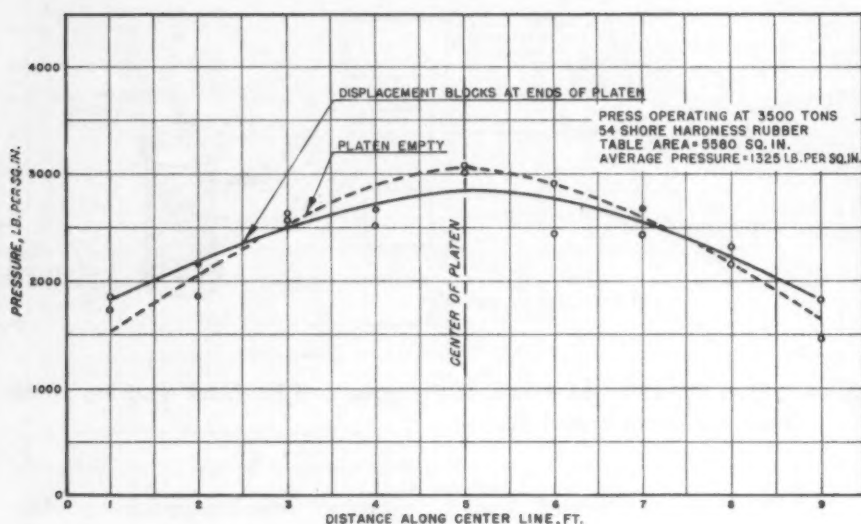


Fig. 9—Hydro-press pressure variation over the platen surface.



ABOVE
FIG. 10 — The pressure distribution along the center line of the platen.

LEFT
FIG. 11 — Variation caused by the displacement block at the platen center.

BELOW
FIG. 12 — Location of displacement blocks at the ends of the table.

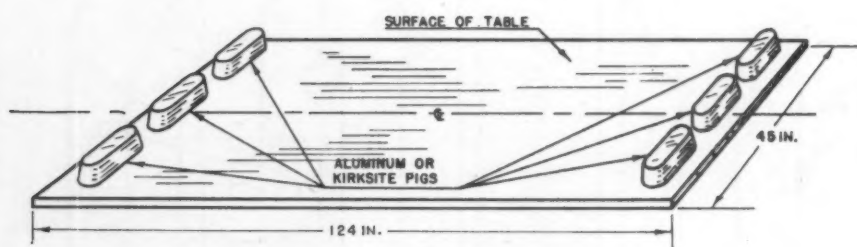


TABLE I

Increase in Pressure Achieved by Increasing Block Height

Original	Height of Form Block, in.	Difference	Increase in Pressure on Top of Block, Lb. per Sq. In.
1	2	1	260
1	3	2	680

caused objectionable variation in springback angles for blocks having the same nominal radii and angles. Such irregularities are virtually impossible to eliminate when radii are made by hand. Mechanical radius cutters should be used if standardization of springback angles is to be expected.

Application of Results

A choice of the various methods of increasing pressure applied to a form block is often limited by existing facilities. However, when a choice is possible, the following steps are suggested:

(1) Increase the applied press load to the maximum; (2) place displacement blocks adjacent to the form block that requires highest pressure, and, (3) increase the height of the form block to the maximum permitted by the thickness of the rubber blanket.

Since a compromise is necessary between pressures obtained and durability, it has been found that rubber having a Shore hardness reading of about 65 is the most satisfactory.

When joggles and convex flanges are not formed completely, it will usually be found helpful to increase the pressure on the block as well as to increase the rubber hardness. This may be done effectively by placing a piece of hard rubber over the part.

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- ⁵ "Springback of Straight Flanges in 24ST Alclad," by F. B. Chapman, T. H. Hazlett, and William Schroeder, *Product Engineering*, March, 1942.
- ⁶ "Elastic Theory as a Tool in Sheet Metal Forming Problems," by F. R. Shanley, paper presented at the annual meeting of the Institute of the Aeronautical Science, Jan. 28 to 30, 1942.

Forging 90-Mm. Shells on Self-Contained Presses

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PRODUCTION of shells by the pierce and draw method is probably the oldest and best known method of producing high explosive artillery shell forgings. Since World War I new types of equipment have been adapted for this work that assure greater precision, faster operation and more economical production. A firm in the Pittsburgh district, for example, is making 90-mm. H. E. shells by this method on two H-P-M self contained Fastraverse presses at the rate of approximately 3000 shells every 24 hr. Instead of using a water hydraulic system and a battery of pumps and weighted accumulator, these presses are individually powered with reversible oil hydraulic pumps and valveless, closed hydraulic circuit. One press pierces the hot slug and the second press "bottoms" the cavity and draws the pierced forging to proper length and cross-section.

Round billet stock is first flame cut to 20-in. lengths and these pieces are then flame notched and broken into two slugs of equal length. Breaking of the billet can be accomplished by a coping machine or a hydraulic press. The fractured ends are examined for piping seams or other flaws before the slugs are heated in a gas-fired rotary-type furnace.

The furnace attendant uses pneumatically operated tongs to load and unload the furnace. These tongs

... Production by the pierce and draw method on vertical hydraulic presses with self-contained oil pumping systems is described herein. An article describing similar methods employed for larger shells, but on radically different equipment, appeared in the Oct. 2, 1941, issue of The Iron Age. For a complete resumé of shell forging practice, the reader is referred to The Iron Age booklet entitled "Munitions and Ordnance Manufacture".

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are water cooled internally. Each slug is heated to a temperature of 2170 deg. F. Uniform temperature throughout is required to prevent erratic deflection of the piercing

punch. To do this, each slug remains in the furnace for 1 hr. and 50 min. The furnace has a maximum capacity of 280 slugs.

After the hot slug is removed



FROM left to right: Slug before heating, pierced slug, final shell forging and shell forging sawed in two to show section.



SHORT billets that have been flame cut from bar stock are nicked by a torch, then fractured into two slugs of equal length.

from the furnace, it is tumbled between two corrugated cast rollers to remove scale. The temperature of the slug at this point is around 2100 deg. F.

The first step in the forging process is to place the slug in the die of the piercing press. This press is equipped with a hydraulic ejector actuated by a small ram located below the surface of the press bed. This ram acts as a cushion and holds the die ejector approximately 1 in. above the bottom of the die. This supports the hot slug so a centering ring, held by an operator, can be fitted over the top of the slug. The centering ring fits into

the inside bore of the die, often referred to as the "pot."

The hand manipulated centering ring serves two purposes:

(1) It centralizes the slug in the pot.

(2) It guides the punch during the piercing operation.

The die pot rests on a spherical seat. In case the punch tends to

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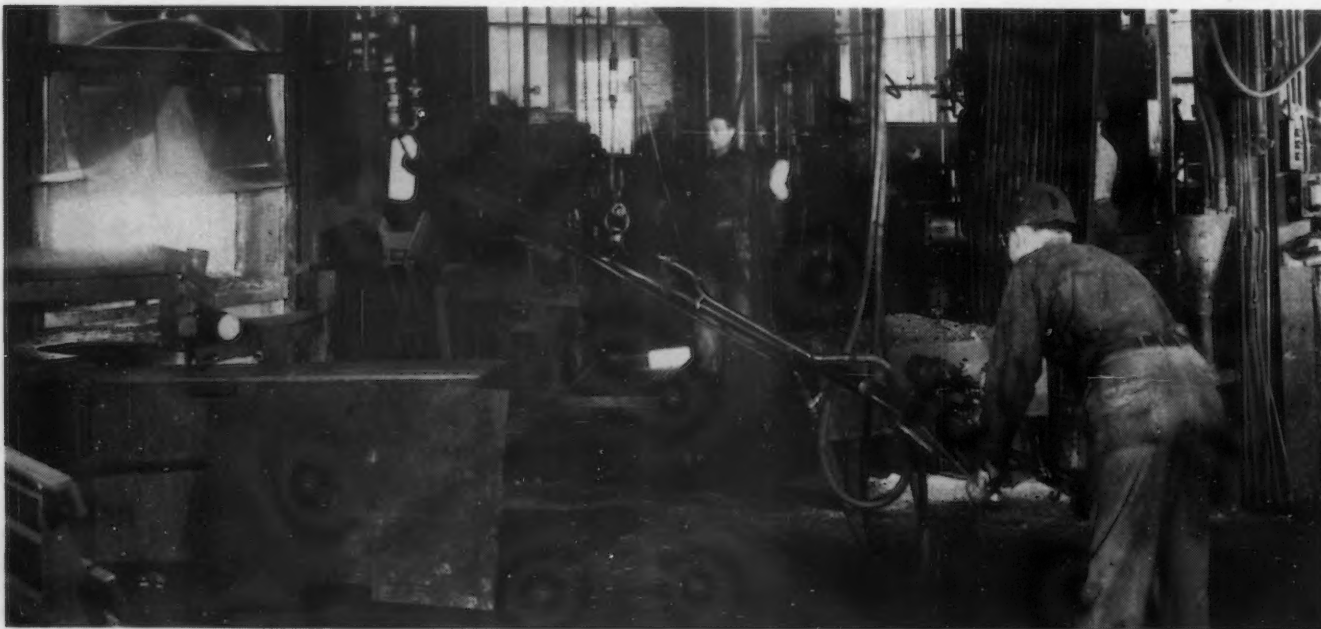
PNEUMATIC tongs, water cooled internally, are used to load and unload slugs from the continuously revolving furnace.

creep in any one direction, the pot can be moved slightly to compensate, and thus maintain uniform wall thickness. The press cycle is semi-automatic and is started by the press operator depressing two electric pushbuttons. Pressure required to pierce the 90-mm. slug, is 125 tons.

On the upward movement of the piercing punch, the pierced slug sticks to the punch and brings up the centering ring with it, until a square flange on the top of the centering ring strikes two projecting lugs. This action strips the slug from the punch. The tong man, who originally put the slug in the pot, transfers the pierced slug to a table located between the piercing and drawing presses. The temperature of the slug at this point is around 1750 deg. Besides piercing the slug, the closed end nib is formed so that it can be used as a lathe center during machining operations.

The tong man at the drawing press picks up the pierced slug and inverts it over a revolving spindle which removes scale from the inside bottom of the slug.

The slug is then placed into the hand manipulated bottoming die of the drawing press. The bottoming die is a tapered cup positioned directly on top of the draw rings. The advancing punch enters the pierced opening in the slug, forcing the slug into the bottoming die. The travel of the draw punch is limited by two vertical stop posts which strike square stop blocks on the lower die. The length of the two vertical stop posts can be ad-



TWO H-P-M hydraulic presses set up to forge high explosive shells by the pierce and draw method. Press at right pierces the hot slug, while the one at the left does the bottoming and final drawing operation. Only one heat is required.

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justed to take care of any shortening of the punch by regrinding.

The bottoming operation accomplishes several purposes:

(1) The thickness between the inside cavity and the end of the shell forging is determined.

(2) The metal is closed around the tip of the punch and chilled so that the punch will not push through the closed end during the drawing operation.

(3) The pierced slug is tapered at the closed end, so that it will enter the draw rings easily.

After bottoming, the press reverses as soon as a predetermined pressure (50 tons for the 90-mm.) is built up on the two die stops. When reversal starts, the press operator pulls a lever which slides the two square die stop blocks forward, uncovering openings through which the vertical die stops posts travel during the drawing operation. At the same time, the operator on the right pulls the bottoming die clear of the slug. Tongs, chained to the press slide, grip the slug to keep it intact with the punch.

The punch advances for the second time, forcing the pierced and bottomed slug through the draw rings. Thirty tons pressure is required to draw the 90-mm. shell forging. When the slug has passed below the last draw ring, spring controlled stripper plates close above it. The press slide strikes an electric limit switch which reverses the press. The upward action of the punch strips the forging from the punch and it drops on a chute which carries it out to a point

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REMOVING a pierced steel slug from the piercing press, the first operation on the heated slug.





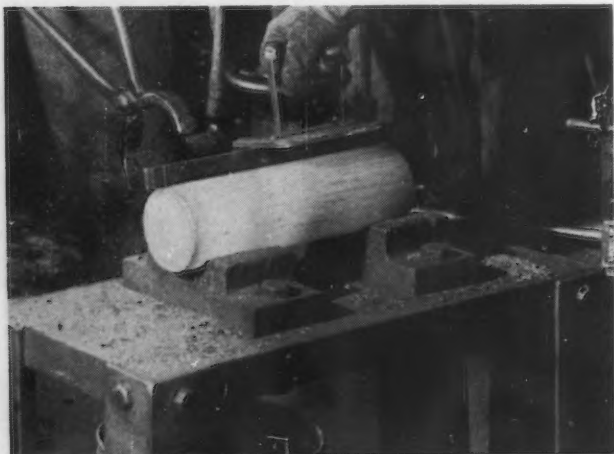
TWO operations are performed by the drawing press. The pierced slug has just been bottomed and is now ready to be forced through the draw rings of the lower die.

of easy access. The temperature of the shell forging at this point is around 1650 deg.

There are three draw rings in the lower die, located one after another with no space between them. The rings all have the same outside diameter but have progressively smaller bores. As they wear, the lower ring can be reground to take the position of the middle ring and the middle ring reground to replace the upper ring.

Each completed shell forging is placed on a bench where it is checked for depth to ensure enough metal to make a finished shell.

Every so often a shell forging is placed on a vertical spindle, where pressure on a foot pedal accurately centers the inner wall of the shell and starts it revolving. A roller connected to a dial contacts the outer surface of the revolving shell forging and the movement of the dial needle indicates any eccentricity or lack of uniformity in wall thickness. These two tests warn of any changes needed in adjustment long before the forgings get to the government inspectors, thus avoiding any large number of rejects. Final rejections average $2\frac{1}{2}$ per cent of the total production.



EACH shell forging is checked for depth to see that there is enough metal for machining the finished shell.

All punches, pots and punch guides are swabbed before each operation with an oil graphite lubricant and, when required, the punches are cooled between operations by immersion in a long handled, water filled cup lifted over the punch by an operator. Most of the cooling is accomplished by circulating water internally through water passages built into the punches and around the liners of the die pots.

Punches require removal for regrinding and shaping. The change, including adjustment in length of stop posts to match the length of the punch, can be made in about 3 min. A change in the piercing pot or draw rings is greatly facilitated by the use of the press platens as lifting mediums. Change of either of the lower dies can be made in approximately 15 min.

New dies and tools require greater tonnage for the first few operations until they acquire a hard, smooth surface. Use of powdered coal or dry graphite reduces the tonnage required by a new tool. Greater tonnage is often needed if the metal temperature is low.

The life of the tools is quite variable. A conservative average would be around 300 forgings for punches and around 3000 forgings for die pots and draw rings. As previously mentioned, these tools can be reconditioned and reused.

During the piercing operation, regardless of whether the punch is forced down through the metal or whether the metal is forced up around the punch, there is bound to be scoring on the punch. There is very little movement of metal during the drawing operation—just the “ironing” of the metal around the punch. What is important is that the drawing punch be perfectly smooth so that a smooth inside cavity is obtained in the finished forging.

The concentricity of the forging depends upon the accuracy of the piercing operation, and only a very slight correction can be made during the drawing operation. Therefore, it is important that the piercing punch start central and continue central. This can be fairly well controlled with a short punch but is extremely difficult, if not impossible, with a long and more or less flexible punch.

New Loader Increases Freight Car Utilization

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DEVELOPMENT of a general utility device for more efficient loading of freight cars has been announced by Col. E. S. Evans, president of Evans Products Co., Detroit, a freight loading authority noted particularly for development of the Auto-Loader for double decking automobiles in freight cars. The new equipment is said to insure load stabilization and save movement of goods in rail transit, "up" the carrying capacity of freight cars and do away with dunnage ordinarily used for bracing, bulk-heading and securing freight in boxcars.

The Evans Utility Loader makes use of tooth-notched bars or racks attached to the sides of the freight car, with cross members attached to these racks by special metal fittings. These fittings lock in place and can be adjusted in 1/2-in. increments to lock loads in position.

A variety of arrangements of these elements is possible to provide suitable shipping arrangements for almost any type of product.

Besides eliminating the use of dunnage, the Utility Loader permits close and efficient packing of goods and adds an average of five tons to the individual car loads. Depending on the product shipped, the increase in carrying capacity of the individual cars ranges from 20 to 200 per cent. Metal stampings, farm implements, bombs, shells, machinery, tractors and parts, are among the shipments already made with 98 per cent of the damage claims eliminated.

An interesting aspect of the device, which has been used for actual revenue shipments of 108 commercial loads over an 18-month period, is the possibility of using wood cars for the duration, if necessary. It is claimed that, since the Utility Loader puts all strains into the vertical beams or stanchions, it can so stabilize the load as to permit the use of wood sheathing for the outside of cars.



ADAPTABILITY of the Evans Utility Loader for universal loading is shown by this view of a car loaded with a variety of farm implements.

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CCROSS beams may be located anywhere along the length of the boxcar at half-inch intervals, including the joint of two bay members. An expansion joint compensates for possible side movement of the car.

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ASPECIAL tool tightens a cross member against a load of five hundred 155 mm. shells. The Utility Loader has cut shell loading costs by almost 50 per cent and reduced the loading time by 25 per cent.

Mass Production of

Anti-Aircraft Gun

THE tremendous importance of the gun carriage is, unfortunately, overshadowed by the more readily evident importance of the guns themselves. The introduction of aerial warfare and the restoration of mobility to modern armies has wrought a transformation in gun carriages and brought into being entirely new types. For many years officers and engineers of the Ordnance Department of the U. S. Army have been designing, creating, building and testing gun carriages of all kinds. The results are marvels of engineering skill and thought. In the

anti-aircraft field, a new carriage was called for from which the gun could be fired at high angles of elevation and all around the circle, from one position.

One of these is the 90-mm. anti-aircraft gun carriage which, along with several other types and sizes of gun carriages, are now pouring out of U. S. factories in endless streams under Ordnance supervision. One of these manufacturers is a New England company which did a heroic job of tooling a plant from scratch when no tools were to be had. It placed orders with nearly 100 subcontractors. Fur-

thermore, it went into mass production on a complicated structure with which it had had no previous experience.

Some idea of the complications encountered in the manufacture of an anti-aircraft carriage may be gained from the fact that between 4000 and 5000 drawings are required as against only 300 or 400 for the gun itself. However, Ordnance engineers had incorporated one design feature that eased the production problems immensely. Most of the parts of these complicated structures could be cut out of plate steel with a torch and as-



Carriages

By J. B. NEALEY

sembled by welding. This eliminated the long process of preparing molds and cores, melting iron, pouring, cleaning and machining castings. It also saved metal and made the carriage lighter. Therefore, this article dwells partly on welding and partly on machining.

It might be stated right here that this carriage has four principal parts. First is the pedestal from which spread out the outriggers and trail and on which the top carriage is mounted. A dome sets on the center of the pedestal. The second main part is the top carriage which carries the gun and recoil mechanism, the traversing and elevating mechanism, etc. This is mounted on the pedestal by means of a socket, built into the bottom, which rides on the dome. The other main sections are the two rubber tired carriers or bogies. A perforated steel platform, in four sections, goes with it, as do the

... In order to get into production fast, a New England heavy equipment manufacturer used much ingenuity in improvising tooling on standard machine tools available on short delivery and in building special purpose machinery fast for producing the 90-mm. gun mount. As in World War I, the concrete bed is coming back, since heavy castings are difficult to obtain.

equalizing cylinder, the equipoise cylinder and the buffer cylinders. In the traveling position, outriggers and platforms are folded up and the entire gun and carriage is picked up on the wheels. The wheels are removed in the firing position and the mount is lowered to the ground. The gun and carriage are then leveled by means of the dome and socket joint.

The first contract for the new

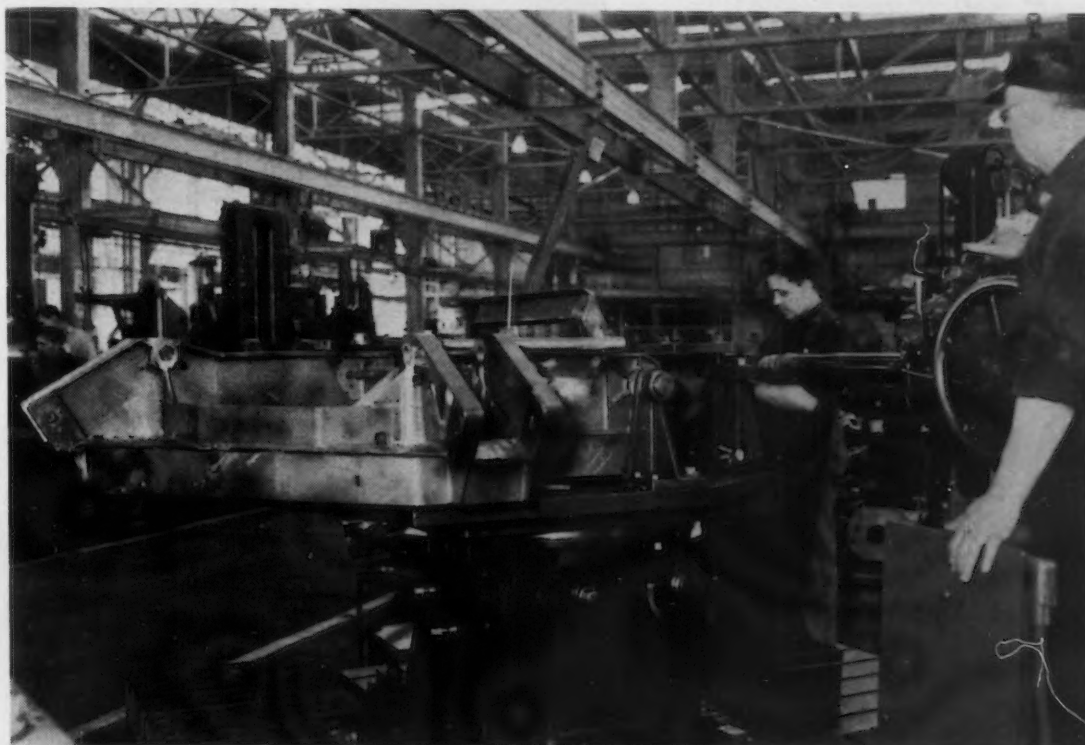
anti-aircraft gun carriage was signed about the middle of last year and the management immediately set to work to assemble welding equipment, machine tools and operators. It quickly renovated an old abandoned foundry, tearing out the cupola for an office and drafting room, and turning the pouring floor into a factory. The cranes, in disuse for 10 years, were repaired. This building was con-

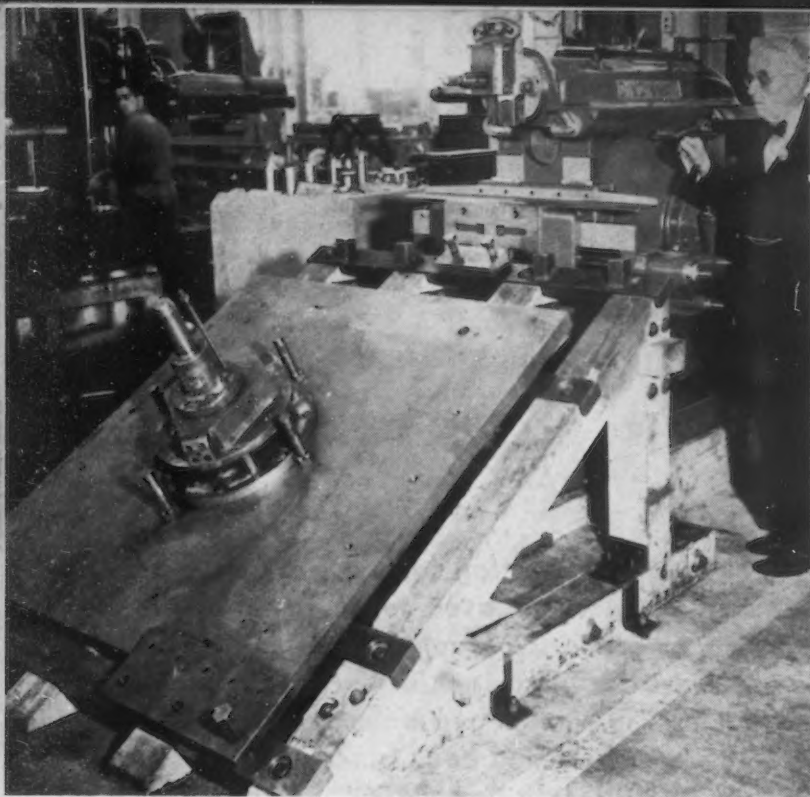
LEFT

VIEW of erection line. Gun in foreground ready for final touches. Gun in background being inspected for firing range.

RIGHT

HORIZONTAL boring mill forming trail end of pedestal.





LEFT

SHAPER with wooden fixture added for shaping outrigger journals in pedestal. This set-up is a temporary relief for boring mill.

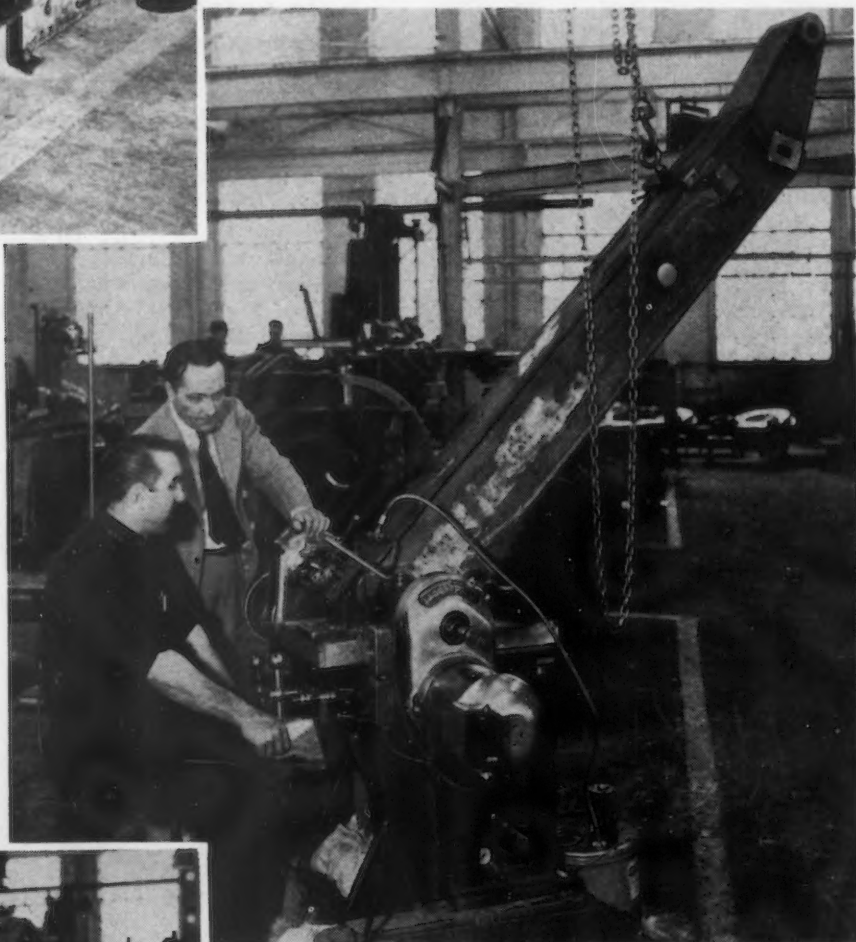
ahead with war orders carrying the highest priorities. The plant went into production with make-shift machines until the single-purpose machines could be designed and built. Four old boring mills, stored at one of the Ordnance arsenals since the last war, were obtained. Motors and beds were gone, so was the factory that built them. New beds were designed and built. D.c. motors were procured, thereby giving these old ma-

verted into a machine and assembly shop; an entirely new building was erected for the welding.

Fifty-five boring mills were needed immediately — 10 were available, but none were obtainable anywhere at any price. The schedules of all machine tools makers were filled for a year or more

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LAPPING spherical dome into socket with special eccentric driving mechanism consisting of motor-driven worm gear and crank with extended angular pin.



chines modern drives and variable speeds through rheostat control.

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ABOVE

SQUARE holes in outriggers are profiled in this machine which has been improvised from two Bridgeport unit milling heads mounted horizontally on each side of the table. Traverse of the table in two directions is provided by the two ball crank levers.

Improvisations

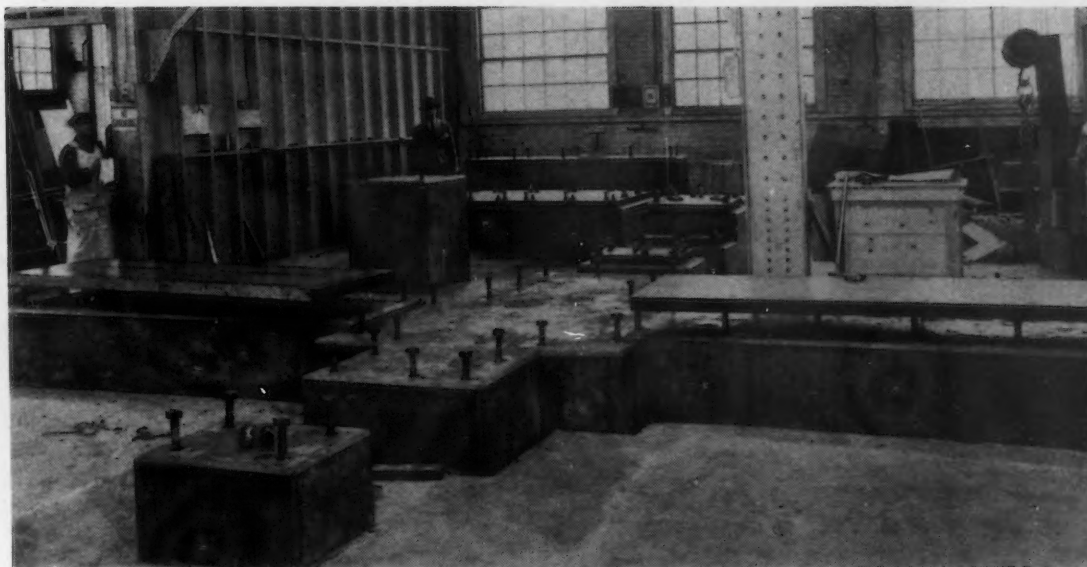
One example of Yankee ingenuity was the conversion of a 24-in. shaper into a miller. It was brought up to the requisite height by putting 12x12 in. timbers under it and an angular locating fixture, on which to hold the work, was built up of timbers and plate steel. Preposterous in appearance, this machine, nevertheless, turned out good work.

A radial drill was set to do a boring mill job. Two Bridgeport milling heads were mounted hori-

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CONCRETE foundations for single-purpose, way type machines. Heavy rolled steel plates are bolted to the piers.



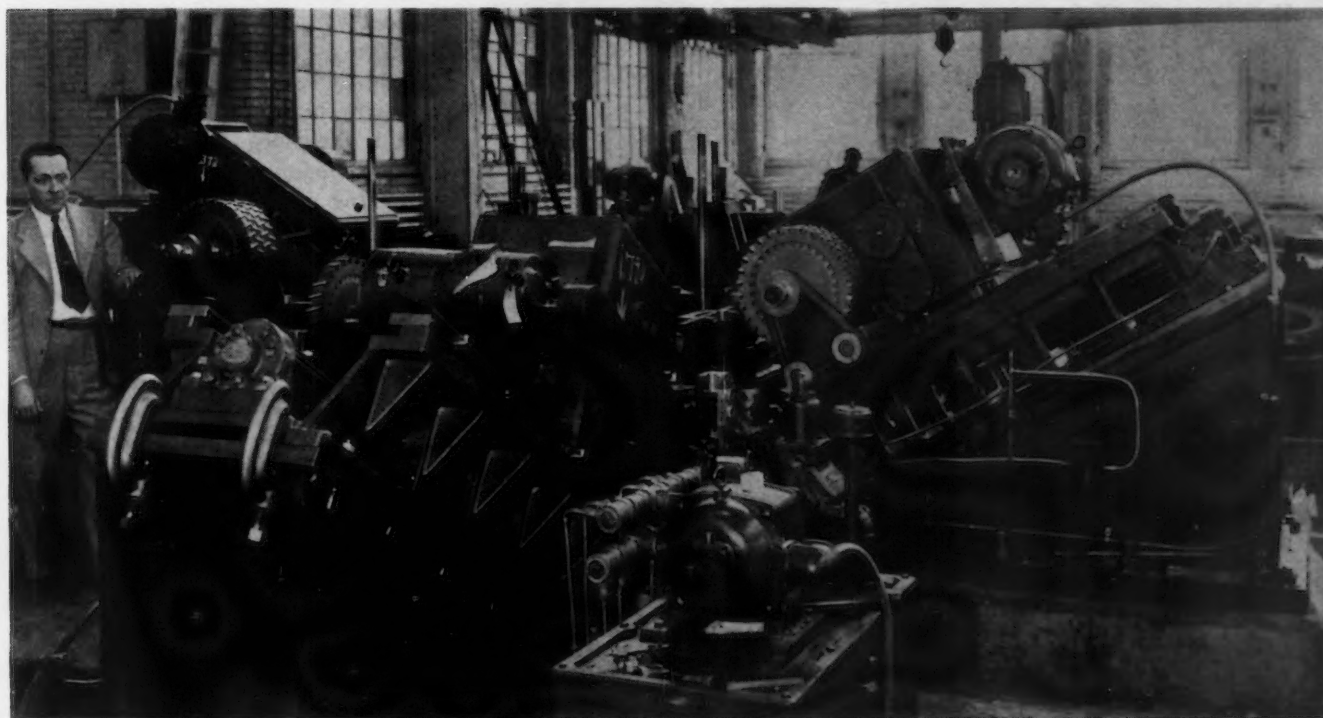
zontally on an improvised base to profile square holes in outriggers, thereby taking the place of an expensive broaching machine. A device for lapping the dome into the socket was made from old weldments and an offset spindle. Numerous other out-of-date machine tools were borrowed or purchased from local mills and retooled to pinch hit until better and faster ones could be obtained. So, in a very few months, the buildings had been completed, and with make-shift tooling, gun carriages were rolling out. In the meantime plant engineers had designed single-purpose machine tools that were fast and efficient, and easy to construct.

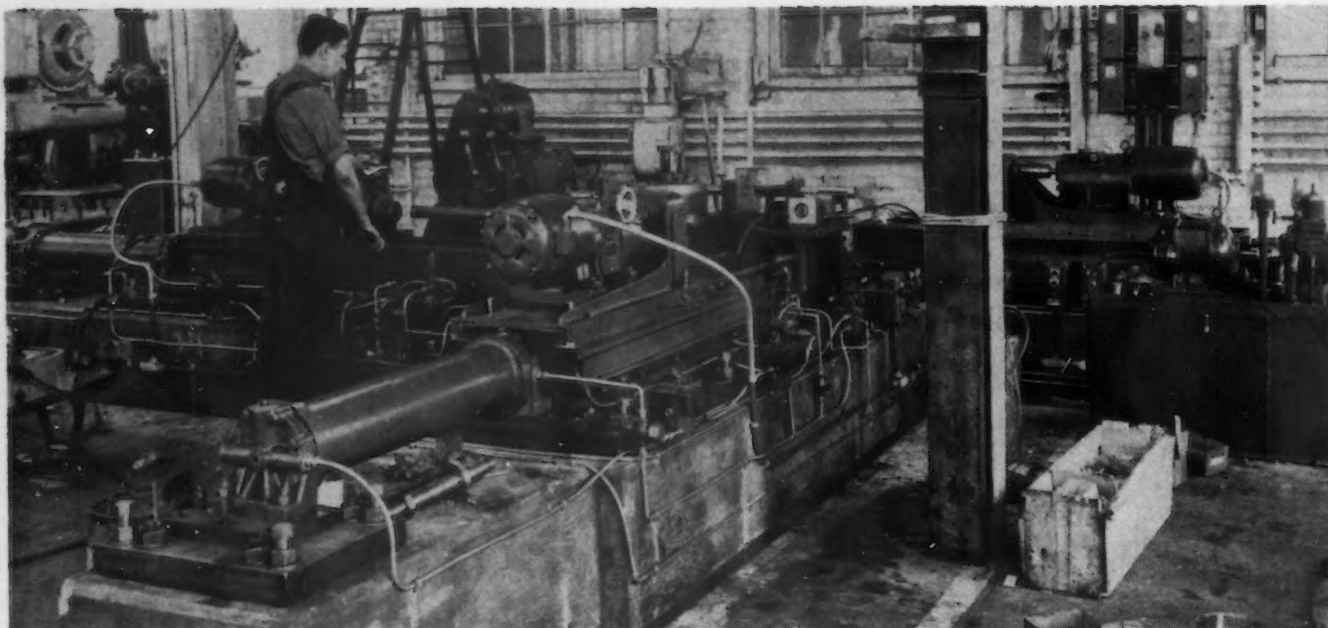
They could be built in a fraction of the time it takes to construct a standard machine and with only a part of the metal. They are so designed that an unskilled workman can operate one with less than a week's training. The machines

are not automatic. They are operated manually through hydraulic controls, but perform three or more operations simultaneously. Speeds are within the normal limits of good machining practice.

Like the gun carriage itself, most of the parts could be cut from plate steel and these parts were bolted together. Instead of heavy cast iron pedestals, the heavy steel base plates of these machines were bolted to concrete foundations. Motors and hydraulic pushers were installed and as there are four or five heads to each machine, one oil pump and tank was made to serve all. The remaining parts were

SINGLE-PURPOSE machine for milling outrigger journals in pedestal and forming trail end in pedestal. The heads are fed at an angle through hydraulic cylinders, controlled through hand-operated valves. Note the large inserted blade slab and side mills.





ANOTHER single-purpose, way type machine for drilling and reaming holes in pedestals for outriggers. These units heads are also hydraulically controlled and pedestals are of concrete.

highly engineered to make precision units.

Examples include three-way-type machines that do three separate groups of operations on the pedestal. In the first machine, the pedestal weldment is centered on a pilot post and located with side stops. The milling heads then

move in from four different directions to mill the three outrigger slots and the contour of the nose. The weldment is then transferred to a second machine, which drills holes in the three outrigger supports and a pin hole in the trail, and welds a slot in the nose. A third machine drills five trail hinge holes and a pin hole and mills an

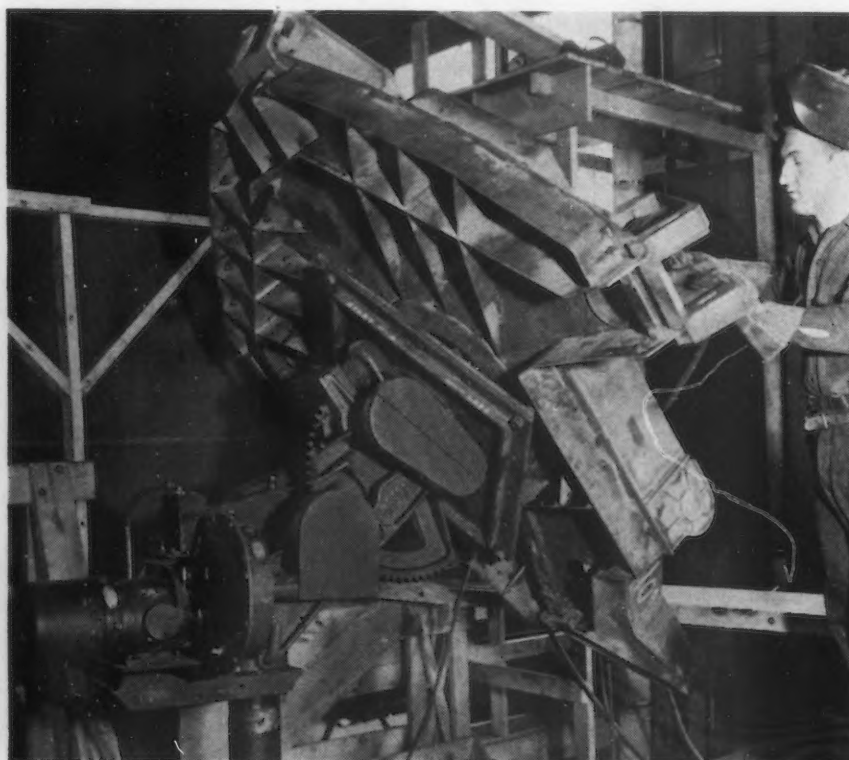
8-deg. angle slot in the nose for the trail link.

Welding Practice

Modern practice and standardized machines and equipment feature the weldery. Weldments are sectionalized and progressive straight line production methods are employed where possible with the following in mind—(1) Ease in handling and welding small weldments or subassemblies, (2) reduction of welding in the final weldment or assembly and (3) ease of inspection. Each of the subassemblies is so jigged as to keep the parts in strict alignment with full allowance for shrinkage and distortion. This so minimizes tacking and fitting that the welder can easily maintain alignment on the jigs and eliminate the tackers and fitters that usually handle such work. The work is mounted on power driven positioners and can be turned in any direction so that the welder can do his work in the most favorable position, using down-hand welding.

Electric welding is used throughout and a. c. in preference to d. c., as it is here considered better and faster. Machines of 300-amp. capacity are employed and currents ranging from 180 to 315 amp. are used, according to size and location of weld and material.

WELDING top side of pedestal on positioner. Single pass fillet welds are used on all plate up to $\frac{3}{8}$ in. thick.



Diameters of welding rods are $\frac{3}{16}$ and $\frac{1}{4}$ in. and they are mineral coated. Single pass fillet welds is the practice on all work up to and including $\frac{3}{8}$ in. thick.

The weldery is housed in a building almost 1000 ft. long, which is served for its entire length with overhead bridge cranes. Two-thirds of this building is divided in three lines of welding booths, divided by two aisles. The booths are completely inclosed with flame proof canvas suspended from steel pipe frames. There are 125 of these welding booths and most of them are served with individual jib cranes.

As an indication of how the carriage is sectionalized and the sections distributed to various welders, consider the pedestal. Subassemblies or weldments are put together by individual welders and these are finally welded together to make the pedestal. Strength and rigidity are obtained and plate conserved by employing box and U sections in the construction design.

Inspection is a controlling factor as all welds are gone over by plant inspectors and then again by Ordnance inspectors. This starts with the smaller weldment sections, the welds being cleaned by shot blasting and given a visual inspection first. Next, they are subjected to a Magnaflux inspection, and all faulty welds marked and repaired. The welds are then X-rayed by a machine that will penetrate $1\frac{1}{2}$ in. of steel. The pictures are taken by exposures running from 10 to 120 sec. according to the thickness of the work. All defective welds are chipped out and re-welded. The



TOP carriage complete with socket and leveling jack. This weldment carries the gun and recoil mechanism, and traversing and elevating mechanism.

X-raying is done in a room with 10 in. concrete walls and the doors are covered with sheet lead $\frac{1}{8}$ in. thick. Roentgenograms of the work are made at the points of greatest stress and the number of pictures to be taken is determined by Ordnance engineers.

With the exception of the outriggers and cylinders, all weldments are stress relieved in a furnace of the car bottom type. The fixtures for the final assemblies are so constructed as to act as gages for the subassemblies and indicate

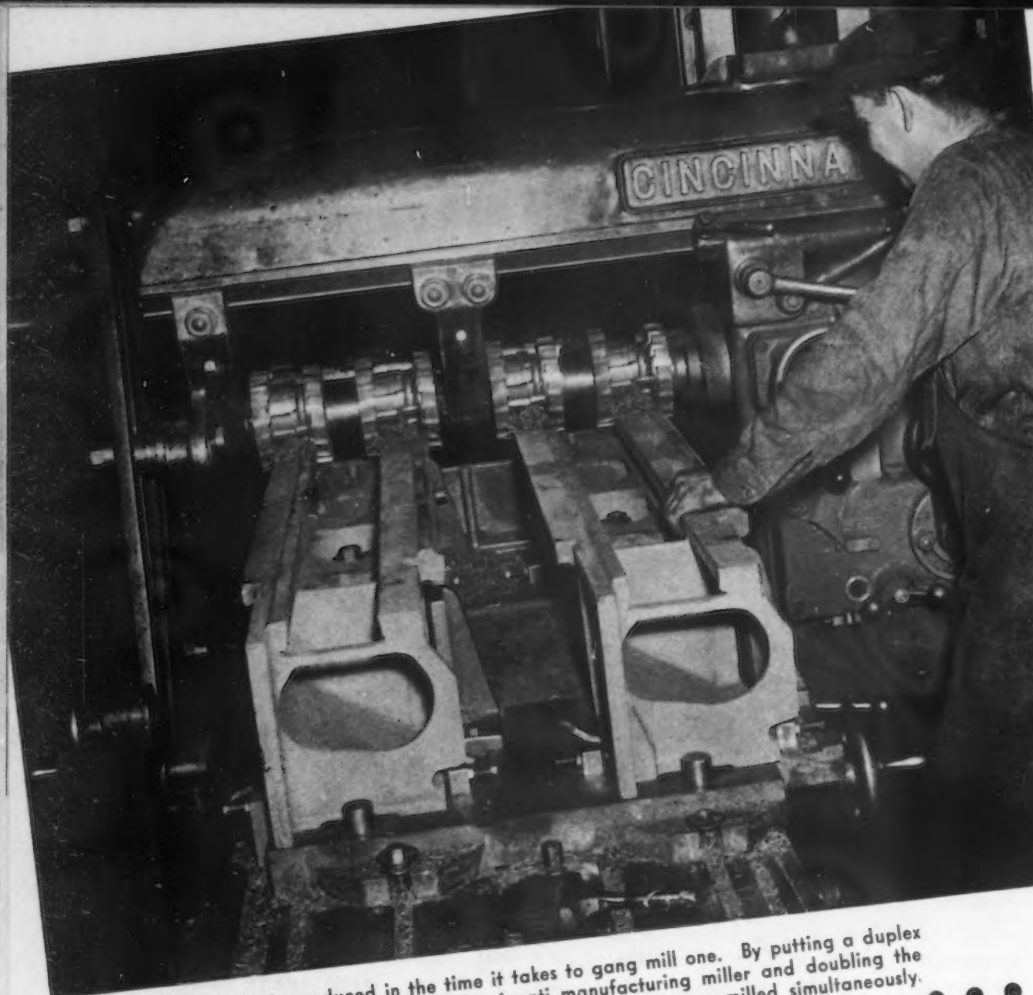
any out of alinement that may have crept in. Here again, allowances are made for shrinkage and distortion during the final welding. When finished these final assemblies are inspected as outlined, and then moved by crane to a table with stops for checking for alinement and dimensions.

Parts likely to distort during stress relieving have supporting struts or braces welded in temporarily or during the heating period. While stress relieving produces no hard scale, an iron oxide powder adheres to the work so tenaciously that it is necessary to shot blast it off. Back on the tables the final assemblies are given a final inspection and check up and are laid out for subsequent machine operations. They then go to the machine shop.

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RECOIL mechanism ready for assembly to top carriage.





TWO beds produced in the time it takes to gang mill one. By putting a duplex fixture on the table of this Cincinnati manufacturing miller and doubling the tooling on the job, the ways of two small lathe beds are milled simultaneously. Use of carbide-tipped inserted bits also has further increased output.

LIKE most other machine tool manufacturers, the Monarch Machine Tool Co., of Sidney, Ohio, has had the problem in the past two and one-half years of increasing production of its product—metal-working lathes—several times over. What the company has succeeded in accomplishing is a story which is distinctly individual and unusual. It involves a number of factors, including the basically important one of establishing at the outset a thoroughly adequate training program for new employees.

When, in the middle of 1941, it was decided to make a substantial increase in the floor space and machine tool equipment to satisfy demands for lathes for the vastly increased government program of defense preparation, 92 skilled workers on the force were picked as instructors for the new men to be hired. Meeting for one hour a day during the approximately 10 weeks' time required for the construction of a new wing to the plant, this group of men was put through a comprehensive course of "sprouts" and drilled in their new roles as instructors by a director of training. Each man was assigned

a definite number of teaching units and was helped in working out his own job studies. These rough job analyses were worked out on the blackboard so that all of the 12 to 15 men in each of the seven or eight groups could benefit by the criticism given by the director.

The initial subdividing of the various jobs was done by the planning department. The main responsibility of the educational director, D. H. McKellar, was to teach the new instructors how to analyze these jobs and organize instruction sheets on them. Each new instructor worked up his own notebook, so that at the conclusion of the training course he would be thoroughly conversant with his assignment and well prepared to train the new men.

This plan was carried out not only for specific machine operations, but also for assembly operations. A program of work simplification has, in fact, been carried out with particular success in the assembly department. Jobs have been broken down into a relatively few steps for each sub-assembly operation. The highly skilled machinist who in normal times literally puts an entire machine tool together single handed has, out of sheer necessity, been

Making

By FRANK J. OLIVER

Technical Editor, THE IRON AGE

replaced by a number of men, each working on only a few operations which when combined result in a complete assembly.

As the new men were hired, they were carefully watched and guided on the job by the 92 instructors who had received the intensive training for supervisory responsibilities. Many a skilled machinist, who knew his job so well that he could go through the motions connected with it almost without conscious attention, found that the course of instruction he had received was of tremendous help in making clear and understandable the instructions needed by the new men, many of whom were face to face with a lathe or a milling machine for perhaps the first time in their lives.

And, of course, in addition to instructions given at the machines themselves, all new shop workers received supplementary classroom instruction on such subjects as blueprint reading, the use of precision instruments and machine shop arithmetic.

Special Training for Expeditors

One of the most interesting and fruitful applications of this instruction was applied not to new machine operators and assemblers but to men who had either been up-graded into jobs as expeditors, or who had been trained from scratch for such work.

It was realized quite early that when a shop is working at capacity with a large volume of orders in various stages of completion, a traffic problem is created which if not handled properly is bound to result in jams of material. The successful mastering of this

Machine Tools More Efficiently

job of keeping materials moving smoothly in process and at a uniform pace geared to the requirements of the departments concerned is primarily responsible for the fact that inventories at Monarch (which necessarily include "work in process") rose only 60 per cent while output itself was being doubled.

To the visitor, the first thing that strikes the eye is the absence of large stocks of parts on the plant floor. This is particularly true in the planer department where bed castings are first machined before being flame-hardened. Immediately apparent, too, is the absence of large castings piled one on another up to the crane rails, a not uncommon sight in many other plants today. On the contrary, everything at Monarch appears to be under control and *actually is*.

... How Monarch Machine Tool Co. more than doubled its output in 1941 over the preceding year—with only 45 per cent increase in the working force and 60 per cent increase in inventories, including value of work in process.

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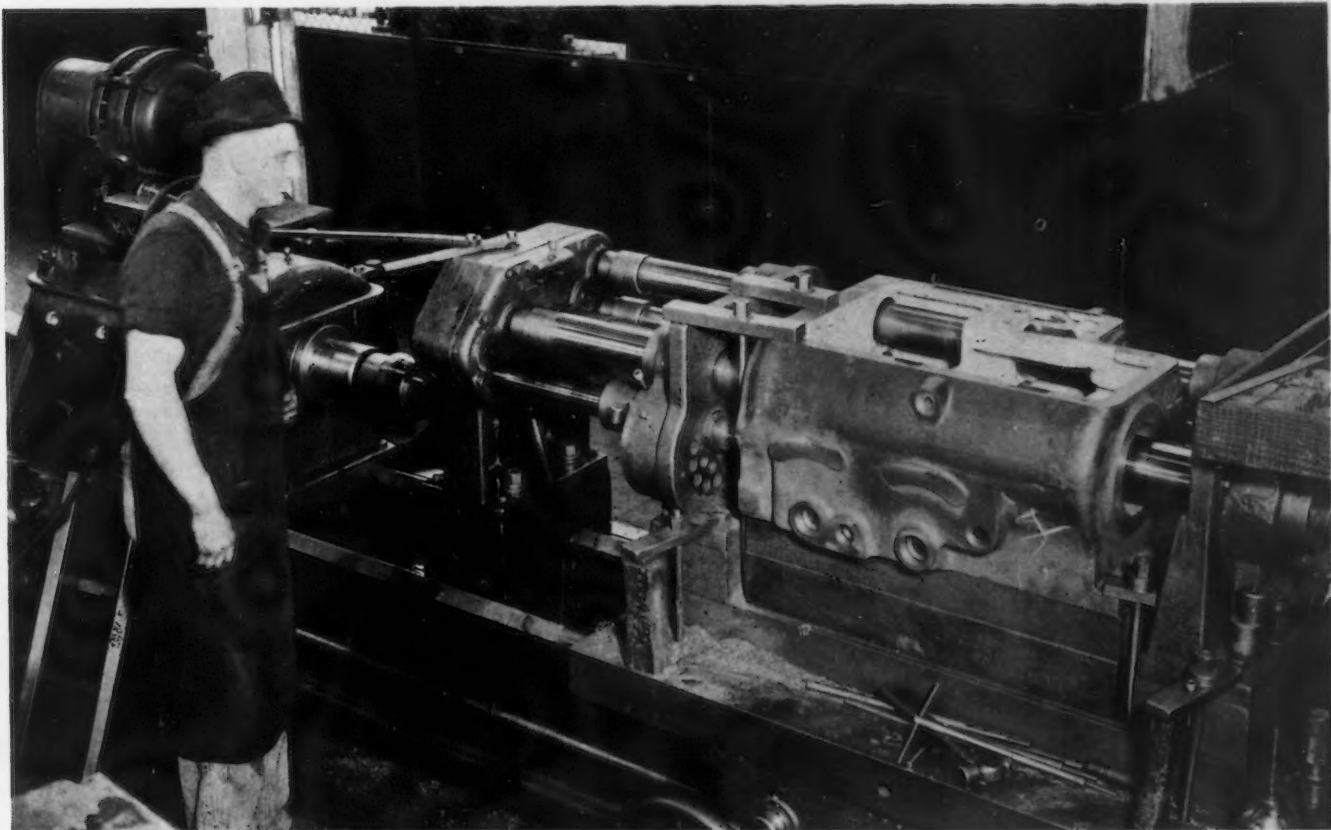
The method used in providing special training for the group of expeditors has not differed greatly from that employed with the shop instructors. The men were urged to study their own jobs and to write out their own job analyses. With the director of training acting merely as the chairman of each session, the men were encouraged to discuss their various problems freely. This approach quickly revealed those things which the expeditors did not thoroughly understand about their own jobs and

their relationship to the whole production problem in the plant. It was possible, once the difficulties were aired, to provide the necessary special coaching, and bottlenecks in production began to disappear.

No one man has so many orders to follow through, or so many operations to keep track of, that he requires elaborate charts or frequent reference to planning department files to handle his job satisfactorily.

Things also move in other re-

MONARCH has adapted a number of lathes for multiple, through boring operations on such parts as headstock castings, a job frequently done, one hole at a time, in a horizontal boring mill or in a radial drill with box jigs. Here five holes are being bored at once with flycutters and piloted boring bars. As can be seen, the fixture is clamped to the flat carriage, which is traversed along the bed with the regular apron power feed train. Fixtures and multiple spindle driving boxes are readily interchanged.





END milling of flat surfaces of irregular contour is speeded up on this Hydro-Tel miller with Servo hydraulic control, enabling the operator to follow the plan contour by light touch on the handwheels. Table moves longitudinally and milling head crossways. Carbide tools accelerate normal output from a machine of this kind, with cutting speed up to 250 ft. per min.

spects at Monarch. The chips fly. Carbide-tipped tools are used wherever feasible. That means that most turning jobs on steel parts and on practically all milling jobs on cast iron are machined with these tools. It is a pleasure to stand by one of the modern vertical millers and watch an end mill tear through a pad on a casting at

the rate of 250 ft. per min. Carbide tools are being used on new planers capable of such table speeds. Incidentally, where a number of castings are mounted in tandem, it has been found that the use of a negative rake on the tool minimizes shattering of the carbide tip due to the shock of the interrupted cut.

One management principle that has been carried throughout this plant is the use of the machine best suited to the job at hand. It is common in the industry for a machine tool builder to use his shop as a proving ground for his own equipment and to apply his own product to every possible operation, whether the application be

HAVING small components handy is one means of facilitating fabrication of subassembly units. This view shows the neat array of gears and shafts under the assembly bench.



logical or not. A plant making milling machines, for example, will mill everything in sight. A manufacturer of turret lathes will perform most turning operations on turret lathes and the number of engine lathes will be few.

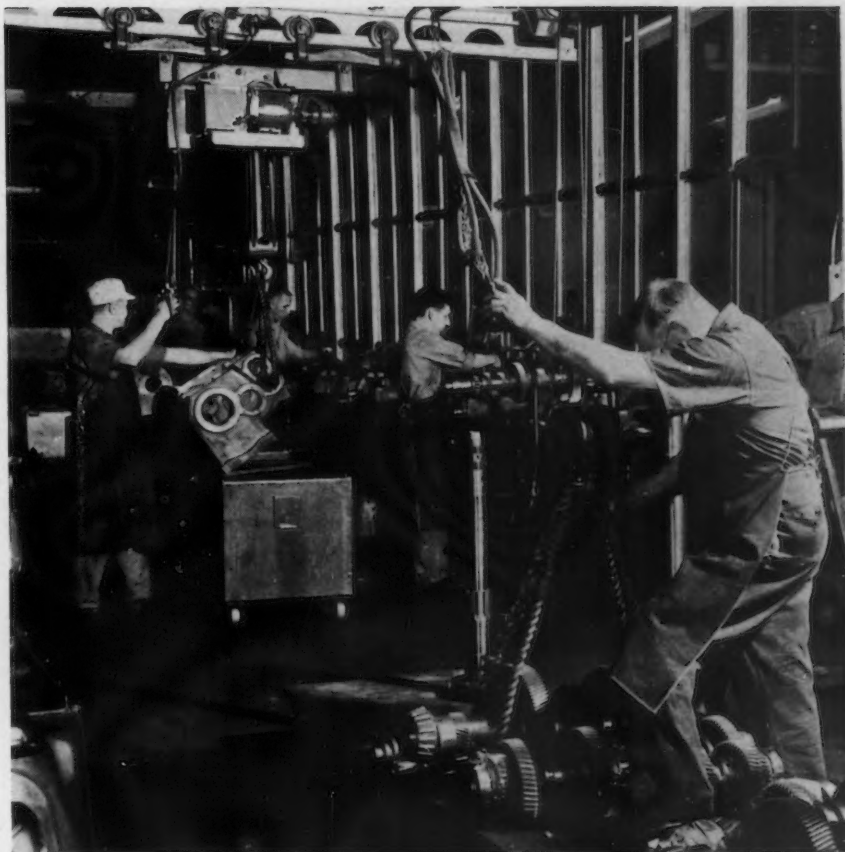
To be sure, Monarch has a large lathe department and the machines are all Monarch lathes. Some of them have been converted by special fixtures and tooling to perform multiple through-boring operations, as indicated in the photographs. But it is also true that Monarch has an equally large turret lathe department. It is also true that Monarch is milling V-belt sheave grooves, whereas some of its own customers are finishing the grooves in engine lathes. Few plants have taken as objective a viewpoint in selecting alternative equipment and methods.

Fewer Models

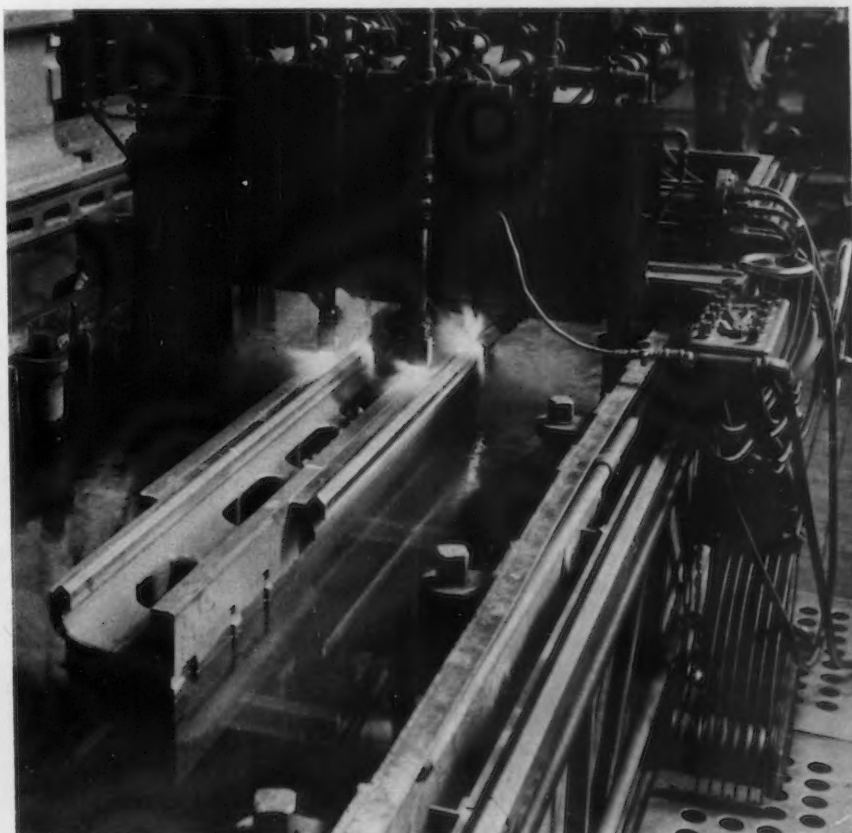
Like many another company, this one is increasing unit output by building fewer sizes of machines. This step is reflected in larger manufacturing lot sizes and simplification and reduction of inventories. It should be explained at this point that the general plan is to schedule parts through on stock orders and fill customer orders, most of which may involve some special features or attachments, from parts stock plus special orders. It can readily be appreciated how marked an influence on the inventory factor a reduction in the number of sizes of units will have.

An ideal to shoot at in any plant is balanced operations. Such a goal is being achieved at Sidney. Part of the balancing of equipment is being achieved by subcontracting, which is a flexible factor. For example, as planer work is speeded up by adoption of carbide tooling, planer work that was subcontracted can be pulled back into the shop. Obviously, subcontracting has been responsible to an appreciable extent for the rapid increase in output.

Other factors to be mentioned are the related ones of improved layout, routing, and material-handling methods. Monarch's plant is laid out on a machine departmental basis rather than in production "lines." When new floor space was added last summer and 200 machine tools purchased in connection with this expansion, all this equipment was not put in the new building, but a re-arrangement



ADEQUATE material handling facilities are a part of the picture. The headstock assembly department pictured, for example, is served by light hoists running on mono-rails which run up and down the length of the bay just like bridge cranes in the high bay section of the shop.



A FEATURE of the Monarch lathe is the flame hardened ways. This view shows the operation being performed on a medium size bed. Note the guide rolls for the rubber hose gas lines which are manifolded from a battery of gas cylinders off to one side.

of the whole plant was entailed since nearly every machine department was increased in size. Actually, the new building houses the lathe, milling machine and gear finishing departments.

This gave opportunity to rearrange equipment in other departments with a view to minimizing back tracking and with straight line flow of the heavier parts particularly. Not only were the machine departments rearranged, but the subassembly division was revised so as to permit breaking down sub-assemblies into smaller units in line with the necessity of using new men trained for this work in a short period of time.

A system of steel benches was set up with a series of shelves underneath for the storage of component parts such as gears, shafts, bearings, etc. Subdivision of the work has necessitated much more bench space than heretofore found necessary, but the output has been correspondingly higher. For the assembly of heavier units, like headstocks and their drive gear assemblies, new light ($\frac{1}{2}$ ton) overhead crane facilities were installed. Lift is by power, but cross and longitudinal traverse is by hand. The headstocks themselves are transported from station to station on casters hand trucks. Bed castings are mounted on dolly

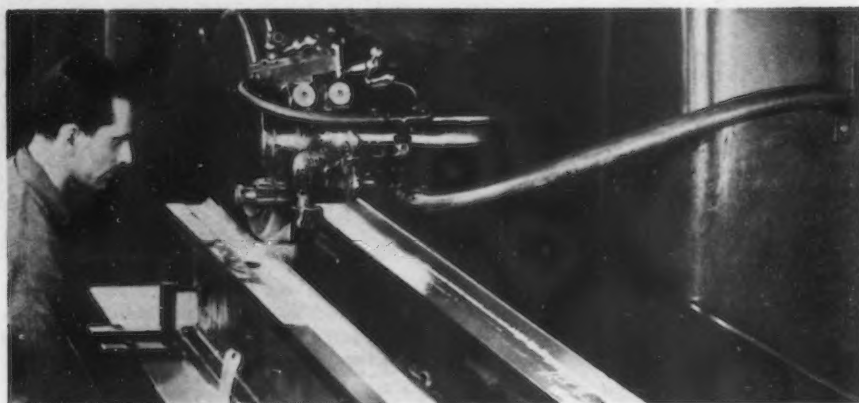
wheels and pushed down a floor track by electric truck.

Summary

To summarize, the many factors involved in this case study of an overall gain in plant operating efficiency in the face of an induction of a high percentage of new workers into the organization may be listed as follows:

- (1) Work simplification program as a prerequisite to a short-term training program.
- (2) Divorcing training instructors from normal production supervision.
- (3) Use of a relatively large number of expeditors, each of whom covers the progress of only as much work as can readily be kept in mind at any one time.
- (4) Use of modern equipment.
- (5) Use of carbide tooling wherever feasible.
- (6) Use of the right machine for the right job regardless of prejudices in favor of the company's own product.
- (7) Improvements in plant layout, routing and material handling methods.
- (8) Subdivision of assembly operations.
- (9) Reduction in the number of sizes of product.
- (10) Balancing of production facilities.
- (11) Subcontracting as a means of achieving production balance.

The most important factors affecting inventories are, of course, Nos. 3, 7, and 9, with particular emphasis on the last named.



SURFACE grinding flame-hardened bed ways. In the set-up pictured one side of the V is being ground with a formed wheel. This manufacturing procedure eliminates time consuming hand scraping operations ordinarily performed on unhardened cast ways.

Steam and Rocket Aircraft

THE idea of a central steam generating plant operating a number of turbines distributed along the wing and driving individual propellers for large aircraft necessitating 10,000 hp. or more, is again reported on by *Luftwissen*. The fundamental difficulty in such installations is the condenser, which must deal with about four times the heat flow of an internal combustion engine of equivalent output. At the same time the steam must be condensed entirely by air cooling and the heat transfer coefficients under these conditions are low. It appears certain that the available wing area will not suffice to house a surface condenser of sufficient size, and it is suggested that a tunnel installation inside the fuselage, operating in conjunction with a blower, offers a means for some of the waste heat being utilized for propulsion.

If the condenser problem could be solved, reasonable specific weights for turbine and boiler should be possible.

The basic features of rotary boilers of Huttner and Vorkauf (Germany) and Bachard (France) are described, and some details of experiments carried out in the U.S.A. by the Great Lakes Aircraft Corp. and the G.E.C. are mentioned.

It appears likely that boilers of the Velox type with supercharged combustion and forced circulation will be the most suitable for aircraft installation. In this connection the 1600 hp. turbine installation on a German coastal patrol boat is of interest. It is stated that this powerplant has a specific weight of about 10 kg. per hp. at a fuel consumption of 310 gm. per hp. hr.

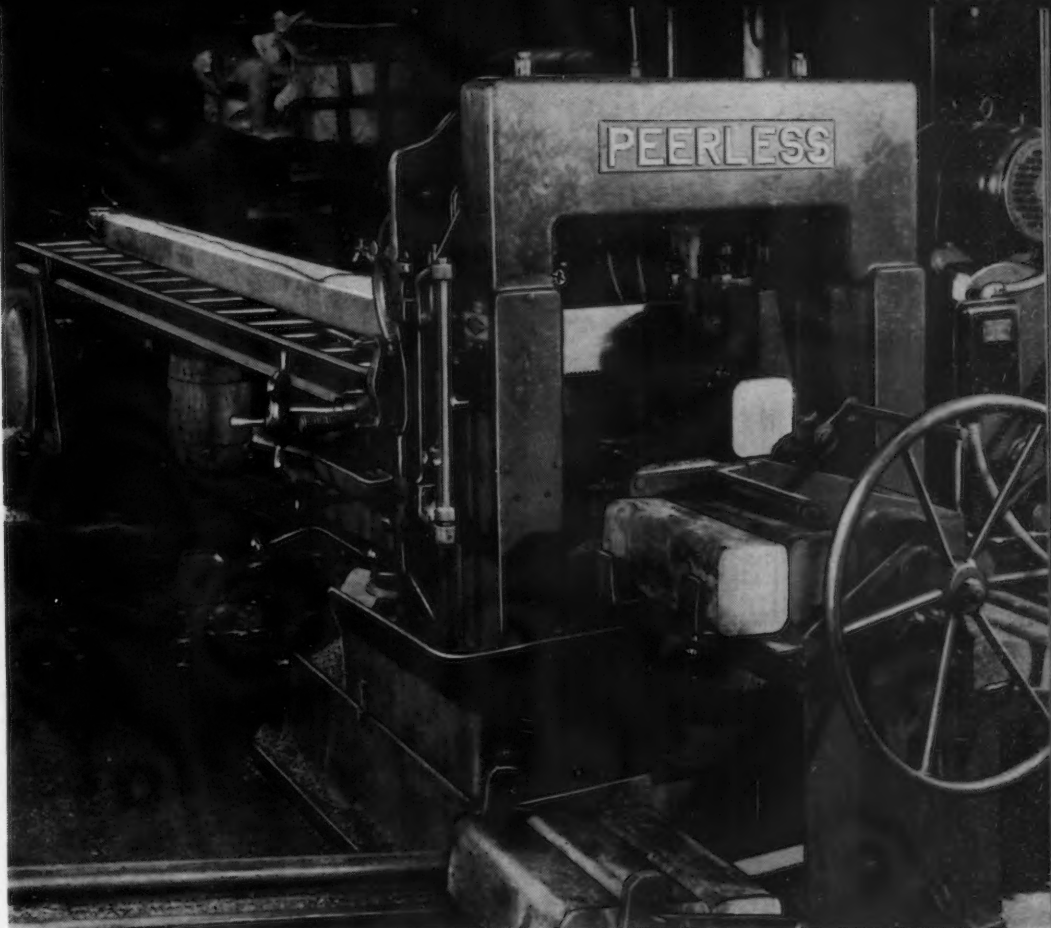
Rocket propulsion has frequently been proposed for facilitating take-

off. According to Flugsport, by utilizing ethyl alcohol and liquid oxygen, it is possible to obtain about 200 kg. thrust for the combustion of 1 kg. mixture, as against 50 kg. thrust for the same weight of solid explosive (powder rocket). Even the latter compares favorably on a thrust per weight basis with existing power-driven propellers, which weigh 2.5 to 3 kg. for 50 kg. thrust. Propulsive efficiency of the jet can be markedly improved by the provision of a suitable venturi.

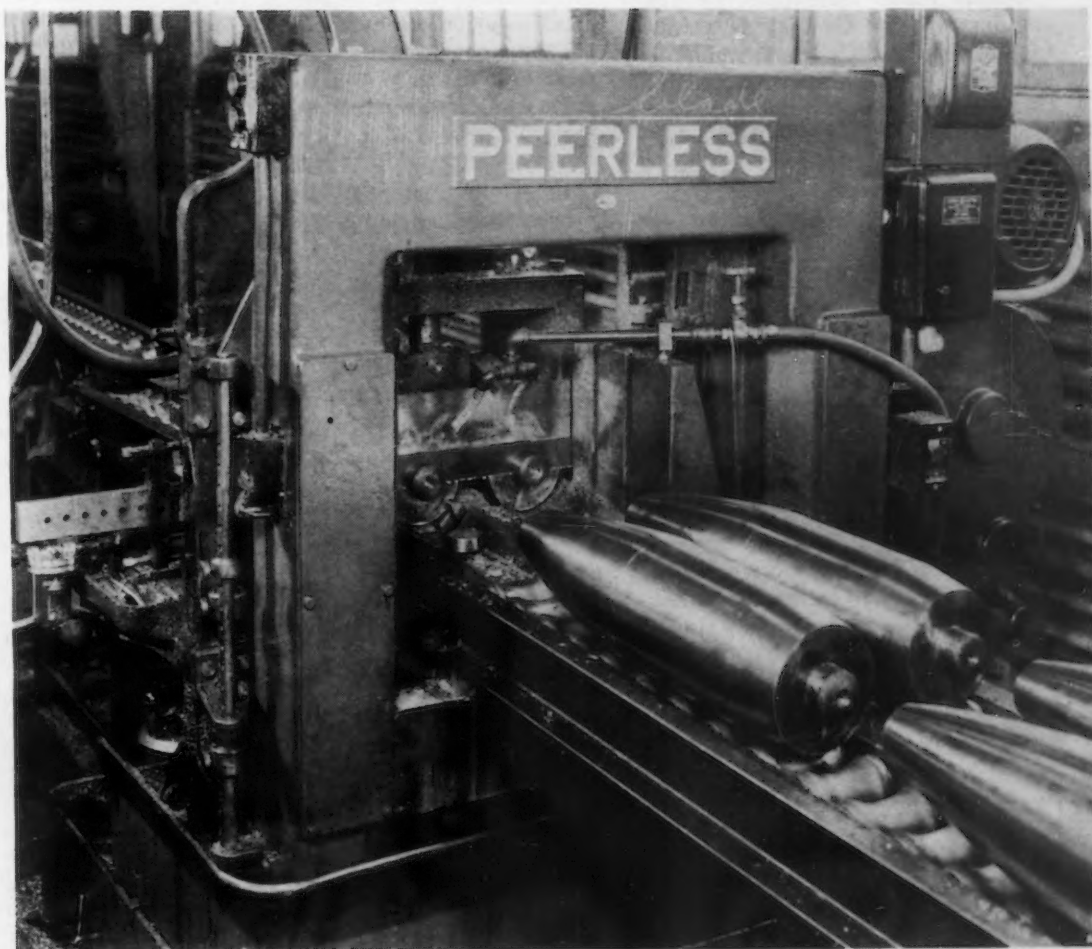
While thermal and mechanical fundamentals of jet propulsion by means of heated air (exhaust) are well known, only a limited application has been made of this method. The overall efficiency is considerably lower than that of the standard powerplant with propeller. The jet system is, however, simpler while installation weight is considerably less.

From Billets to Bullets

SAWING of shell forging billets is done automatically in this hydraulic feed hack sawing machine. At the completion of the cut, blade rapid returns to uppermost position, stock locking vise opens and the remaining stock is pulled forward until it hits a length gage. The locking vises are then closed automatically and the blade is lowered to and fed into the work under the correct hydraulic pressure. It is important that the billets be cut accurately to length and absolutely square to avoid trouble in the hot piercing and drawing operations. Saw kerf is only 1/16 in. wide. Shown is SAE X1335 stock, 5 1/2 in. square, being cut into 15 in. lengths for 155-mm. shell forgings.



CUTTING off the center nibs on the butt ends of 155-mm. shells after the machining operations. The air-operated holding vise on this 14-in. Peerless saw securely locks the shells in place while the 2-in. butt ends are removed. A four point, 0.072 x 1.5 in. high speed steel blade is used, cutting at the rate of 125 strokes per min. Between 2000 and 3000 sq. in. of stock are cut with a single blade when the right type of coolant is used. These photos were taken in the plant of a former agricultural equipment manufacturer in the Middle West.



Dry-Cleaning Fluids

VIRTUALLY every piece of metal handled in industry, and this means every piece of metal in military equipment, must be thoroughly cleansed before it takes finished form.

Were it not for synthetic cleaning fluids made from chlorine, metal cleaning would be a serious bottleneck in the all-out victory program. Lacking these fluids in quantity now, the enormous volume of goods necessary to ultimate triumph would flow at a slower rate.

According to E. I. du Pont de Nemours, permanent adhesion of any finish and satisfactory inspection require perfect cleansing of the metal parts. Oils, greases and the like must be removed after machining, polishing and other operations in preparation for painting, bonderizing and similar finishing processes.

Fluids made from chlorine are familiar to the chemist as chlorinated solvents, to the layman as synthetic dry cleaning fluids, and to the metal worker as chemicals used in cleaning their materials by a process called "solvent degreasing."

Precious parts vital to military equipment can be cleaned in large volume by solvent degreasing with great efficiency. The method cleans metal completely, leaving not one trace of oil. Moreover, the cleaning is carried out at a very fast pace, and the equipment requires very little factory space.

Astounding are the increases in consumption of these synthetic fluids by leading military equipment manufacturers during the past three years. Seven manufacturers used two and one-half times as many pounds in 1940 as they did in 1939, and they more than doubled their 1940 consumption during 1941. These figures rep-

resent an over-all increase of 5000 per cent in three years.

An accurate barometer of the accelerating victory program, the figures help explain why a shortage is threatened in the odorless, non-flammable synthetic fluids used to clean clothes.

Properly to appreciate the import and significance of these mounting figures is to know something of the history of metal cleaning. Tumbling in sawdust, sandblasting, and just plain scrubbing by hand with soap and water are other methods which have been used at times and on occasion discarded by industry for one reason or another.

As old as soap itself, alkali washing still is the most extensively used. It is comparable with dish washing in the home, except that alkali compounds are substituted for soap. A metal part is dipped or tumbled in or sprayed with alkali solution often enough to wash off extraneous matter. An automatic alkali washer for large metal parts that are very dirty has several tubs or spray units and sometimes one or two drying units.

Long an established cleaning process, the advantages of alkali washing are many. The alkali solutions are inexpensive and the washers, big or small, last for years. One of the first commercial metal cleaning machines, installed at an automobile plant in 1919, still does yeoman service. It is the method most often used for cleaning sheet metal rolling from a mill at speeds in excess of 300 ft. per min.; and it still is the least costly cleanse for certain ordinary metal parts.

Principal among its shortcomings is the threat of the solution etching and ruining precision parts that are die-cast from certain now highly important metals. Such parts, made in all sizes for varied

military equipment, were little used in World War I, and these few were cleaned by hand with petroleum products such as oleum spirits, naphtha and kerosene. These metal parts must be wholly clean before finishing, and solvent degreasing has been particularly efficient in cleaning them thoroughly at mass production rates.

Alkali washers are large and take up considerable floor space, for very dirty metal must be exposed the alkali solution for a long time. And after the wash, it must be dried before finishing processes such as painting. Sometimes the washes are not thorough, leaving stains, spots, marks, runs, and streaks on the metal part. Another fault is that the not so accessible portions of complicated metal parts are difficult to cleanse.

In cleaning metal with petroleum products, each part has to be dipped into successive baths, because the petroleum cleanser soon becomes contaminated. This makes the bath slow, costly and not always efficient. Too, these cleansers are hazardous to handle because they are inflammable and explosive; therefore laws restrict their use. They did, however, meet the small need for cleaning certain metal parts without damage during the first World War.

In solvent degreasing, a dirty metal part is either dipped, sprayed or tumbled in the chlorinated solvent trichlorethylene, or it is rinsed in a vapor from this chemical, much as a person takes either a tub, shower or steam bath. Oil and grease on the metal are dissolved by the fluid or its vapor just as water dissolves sugar. No scum is left on the solvent as the oil or grease is dissolved. The solvent runs off the metal readily, which dries almost instantaneously. Quantity and type of dirt determine the extent of the cleanse. If the metal is very dirty, the tumbling and dipping action helps like scrubbing. A vapor rinse is always the final step, because vapor which condenses on the metal contains no contaminant which might stick to the metal. The vapor rinse alone is sufficient

Fifty-first in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

Speed Arms Production

when the metal is oily but not very dirty.

In alkali washing, however, dirt is largely removed by mechanical action. Alkali emulsifies mineral oils and reacts with vegetable oils to make a soap which, in turn, emulsifies these oils. But the emulsified oil remains on the surface of the bath, and metal is contaminated when it is lifted from the bath. That is why solvent degreasing, with the final rinse in uncontaminated vapor, is so satisfactory when thorough cleaning is necessary.

Germany discovered this cleaning method during World War I. Crude solvents were poured unheated into a tub, and the metal part was placed in successive tubs of cold fluid to assure the best possible cleanse. Sometimes a single metal part was placed in seven successive baths. Development of this method was taken up in England. England and Germany both arrived at the idea of a hot fluid and vapor rinse about the end of World War I. During the '20s, England, Germany, France, Belgium, Sweden, and Norway cleaned metal this way. Their equipment was small and very expensive, certainly not adaptable to mass production by the American standards.

Carrier Engineering Co. brought the first degreasers to this country about 1928. It built several degreasers like those from abroad, but soon realized they were too expensive for production-line cleaning. However, Carrier deserves credit for pioneering solvent degreasing in this country. Roughly one hundred of these units are still operating.

During the early '30s, G. S. Blakeslee & Co., of Chicago, and Detroit Rex Products Co., of Detroit, now the chief manufacturers of degreasers, entered the picture. Rex had been working with solvents for 8 or 10 years, and had developed a process for cleaning automobile bodies with a solvent spray. Its own engineers developed a variation of the foreign degreaser after years of work, and patented it. Rex started building degreas-

... Invented abroad, solvent degreasing has been adapted to America's mass production methods and tremendously improved by chemists and engineers during the past decade.

o o o

ers in 1931. It sold two that depression year, the first to a refrigerator manufacturer and the second to an automobile manufacturer.

The Blakeslee company first looked into solvent degreasing in Europe in 1929, and in 1932 secured the rights to the German patents of Alexander Wacker. Its first degreaser was placed on exhibit at the Steel Show in Buffalo, N. Y., on Oct. 1, 1932, and was sold to Ralco Mfg. Co. for cleaning small electrical parts. This first Blakeslee degreaser was 36 in. long, 18 in. wide, and 45 in. high.

Du Pont had been ready for some time to supply trichlorethylene, which to this day remains as the principal solvent used. But even with a comparatively inexpensive degreaser adapted to fast production lines and an ample supply of solvent, the equipment manufacturers faced an up-hill job in selling the new method. Solvent degreasing was so entirely foreign to traditional ideas and conceptions of metal cleaning that industrialists listened skeptically to the claims made for it. Even when the process was demonstrated to be successful, they were slow to purchase equipment. It was a matter of getting some degreasers installed in key plants, and letting them "prove themselves." They did and solvent degreasing was fairly well established in two years' time, and growing steadily.

More and better cleaning in less space, and cleaning of precision parts on a mass production basis, are the outstanding advantages claimed for solvent degreasing. It has others, hardly less important. A degreaser requires only a quarter as much heat as a comparable alkali

washer. If operated efficiently, solvent degreasing is competitive in costs with all other methods; for some work it is much less costly. Degreasers can be used in small shops of all descriptions and garages where space and cost prohibit alkali washers. The fluids may be reused time and again, the only loss coming from diffusion and inefficiency.

Since 1932 solvent degreasing has been used for an increasing number of diversified metal cleaning jobs. Note a few examples of the extent and versatility of this method. Metal drums for shipping grease are themselves degreased when fabricated so that they may be painted. Filaments for radio tubes, roughly the diameter of a hair, are cleaned as well as a 3000-lb. part of a steam shovel. The filaments are mounted on metal trays for their bath in a small degreaser; the huge steam shovel part is dipped into solvent vapor.

Human bones are cleansed of grease and fat in degreasers at the Museum of Natural History in New York, Cornell University and Columbia University before they are used for archaeological and medical studies. Dentures are de-waxed by this process. A degreaser six in. wide and 12 in. long, probably the smallest made, cleans jewels, main springs and tool gages.

Large factory degreasers are most impressive. One 75 ft. long, 20 ft. high and 10 ft. wide, probably the largest ever built, cleans automobile hardware and accessories. There are degreasers to clean beer cans, 3600 coffee percolators per hr., kitchen cabinets, stoves, 4000 to 5000 automobile

(CONCLUDED ON PAGE 124)

"Flying Fortress"

Facts and Illusions



THE British designed two-gun turret above the nose of one of the Boeing B-17e four-motor bombers of the Hawaiian Bomber Command.

MAGNIFICENT work by Boeing Fortress four-motor bombers of the U.S. Army Air Forces in the Far East has very naturally led to much-merited laudation of the airplanes and their crews both in this country and in the United States.

Unfortunately, anxiety to pay the highest possible tribute to this much publicized bomber has sometimes resulted in invidious comparisons being drawn between the Fortress and the bombers of other countries, usually to the disadvantage of the others. Most of the claims were in general terms and not widely read, but one long article, which was printed in *Fortune* and published in condensed form in *The Reader's Digest*, made a direct and misleading comparison with British four-motor types. The news that Fortresses had bombed Japanese ships at Port Blair in the Andaman Islands sent the London *Evening News* rushing to *The Reader's Digest*, with the result that the inaccuracies and exaggerations of the original *Fortune* article have had another run.

This report from British Aeroplane may be a little too severe on the "Flying Fortress", but it serves to dilute the astonishingly exaggerated reports on American aircraft performance that are such a standard feature in newspapers here. Only within the past few months have American aircraft gone into production which meet first-line combat standards as to power and fire-power for fighters, and self protection for bombers.—Ed.

We give them yet another, so that by quoting some figures for a representative British bomber alongside those of the Fortress, we may dispel a few illusions and correct some of the misapprehensions which may exist. The *Evening News* wrote:

"From India comes a communiqué describing in glowing terms how a squadron of America's Flying Fortresses 'strafed' Port Blair, in the Andaman Islands, the base from which the enemy can maneu-

ver so easily against Calcutta and the Burmese oilfields.

"They were used with equal success by the American Army Air Corps in various parts of the East Indies. The Japanese air chiefs who scoffed at the Flying Fortresses as 'impracticable' three years ago must now be feeling that no base less than 3000 miles from an Allied landing field is 'safe.'

"These four-engine bombers are a peculiarly American weapon—obviously designed by men who have been creating large air liners for a nation that must live among high mountains and vast distances.

"No European country has ever experimented with a military bomber equal to the four-engine Boeing Flying Fortress B-17 or the Consolidated B-24, which can carry 2½ tons of bombs and 4 tons of bombs respectively 3000 miles at 300 miles per hr. and then fly back eager for another trip.

"When Britain lost her Continental air bases she asked President Roosevelt for the 'loan' of Flying Fortresses to use in raids against Berlin and beyond.

"They were transferred last Spring, and the results of their operations made the President ask for 500 bombers a month from an industry that was scheduled to produce only 40."

From this, the innocent reader would imagine that the Fortress has an outward flying radius of 3000 miles, cruising at 300 miles per hr. with 2½ tons of bombs and the B-24 an equal performance with 4 tons of bombs. Furthermore, that there is not another bomber even to compare with them and that operations with the R.A.F. to "Berlin and beyond" have proved their prowess.

In fact, according to American

figures, the absolute maximum range of the Boeing, out and back, without bombs, is just over 4000 miles and about 2000 miles with around 4000 lb. of bombs. Moreover, the cruising speed is about 245 miles per hr. Nor have Fortress bombers ever been over Berlin, or within several hundred miles of it. They are unsuited for long range operations over heavily defended enemy territory because of their poor armament.

Comparisons are rarely useful, but a few figures for the Stirling I and the Fortress I are interesting.

	Stirling I	Fortress I (B-17c)
Prototype first flew	July, 1939	July, 1935
Span	99 ft. 1 in.	103 ft. 9 in.
Loaded weight	70,000 lb.	47,500 lb.
Max. bomb load .....	.8 tons	2½ tons
Max. speed	280 m.p.h.	320 m.p.h.
Normal cruising speed	227 m.p.h.	245 m.p.h.
Armament	8 machine guns (turrets)	5 machine guns (hand-operated)

When in service in England, Fortresses were handicapped by the almost constant gray skies of Northern Europe and had little chance to exploit their chief virtue—that of being able to operate at great heights. When they were sent to the Middle East, sand and rainstorms balked them, and once more the R.A.F. could not get the best from them. They dared not be used for normal day bombing operations because of their inadequate armament. Doubtless, when the lessons of modern war have been embodied in the design, and a means found for accurate bombing from great heights, the Fortress will be a valuable asset to any air force operating against targets not frequently hidden by a blanket of clouds.



Fighting Steel . . . It takes working, sweating, fighting Steel to build tanks and ships, planes and guns, tools and machinery. The job of producing Steel to crush the attackers of America has called forth our best efforts in every emergency since 1826. And when *this* important job is done, you will again get Steel of the same excellence that made Uncle Sam call on us.

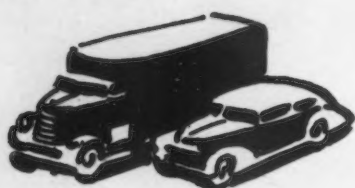
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Assembly Line . . .

• War program in U.S. reaches model changing stage . . . One type of aircraft is now easing out another for strategic reasons . . . Glider is new product to be bought out by the automotive-aircraft industry.



DETROIT model change-overs again are being talked about in the automobile industry—only this time the change-overs affect tanks, airplanes and similar war-time products.

Actually, the first major model change-over in the war program occurred when Chrysler, at the Detroit Tank Arsenal, switched from the M-3 to the M-4 medium tank, or from the riveted hull to the welded hull. It did not receive much publicity at the time because war-time restrictions do not encourage that sort of thing, but now every one knows that changes have been made and that production on the newer models is rolling along steadily.

Currently the industry is seeing background preparations made for a model change in the aircraft field that will be much more far-reaching than that in the tank field. This is the case (name omitted) in which one airplane type is gradually being eased out of the production picture for strategic reasons while another type of craft, used for military missions of an entirely different nature, is prepared for production. Contracts were signed and tooling begun during the early spring months, and it is likely that the pilot assemblies will go down the line in August or September. In this particular case the firm is not manufacturing "fly-away" airplanes, but is supplying the most important sub-assemblies ready to take to the air. It is quite likely that the model change-over will involve production of complete fly-away airplanes.

It is interesting to note that, with the "pressure on," the industry is going to make this model change-over in four to six months' time. This time is about the equivalent to the best accomplished during automotive production days. But there is a difference. The speediest of the automotive change-overs always occurred when old designs were simply revamped with new sheet metal, etc., and with minor changes in the chassis and principal units of the car. Under those circumstances, it was possible to start tooling in April or May and make the model change-over in August or September. The current aircraft example, however, is different in that it means the complete abandonment of one design and the complete tooling for another design. This is the first instance of this kind during the automotive industry's participation in the war program.

A new product is being brought out by the industry, too—and that's a familiar statement to be making at this season of the year. The product, however, is not a familiar one to the industry. The story is that the Ford Motor Co. has been asked by the Army to prepare a glider design for possible mass production. Estimates place the wing span of these transport craft at about 85 ft. from tip to tip. They will be made of wood and plywood and are expected to occupy the facilities normally used by the company in manufacturing station wagon bodies and other woden products. Designers started to work over drafting boards just about three weeks ago and it is predictable that Ford will obtain a production contract for these motorless aircraft when the design is completed and approved.

OTHER contracts for the manufacture of gliders from two-passenger training types up to 24-passenger seaplane types have been publicized during the past year, some of them indicating substantial volume in the eight-seat and 15-seat types. The furniture industry at Grand Rapids, Mich., already is participating in a program for the manufacture of plywood parts for these craft and for other military aircraft. The size of the glider program is difficult to estimate but it is already being reck-

oned as one of the major phases, outside the combat aircraft field.

Henry Ford himself, along with Edsel Ford and C. E. Sorensen and R. H. McCarroll, put in an appearance last week at the exhibit of aircraft parts and production methods which the company's engineering and production staff had prepared in connection with a meeting on war production of aircraft, sponsored jointly by the Society of Automotive Engineers, Detroit Section, and the Engineering Society of Detroit in the Horace H. Rackham Educational Memorial. Ford displayed great interest in finding out how the production lessons were being received by the engineers present (more than 4000 attended during the day) and ended up by deciding on the spot that the educational display should be set up in the Ford Rotunda where qualified visitors of the plant will be able to see, in one spot, a compilation "in-the-flesh" of some very interesting and valuable engineering and production data. (See description, page 106, June 11, 1942.)

A colorful highlight of the meeting was the unexpected attendance of Col. A. W. Herrington, president of Marmon-Herrington Co. and the national president of the Society of Automotive Engineers. Back only a few days from India, where he accompanied Louis Johnson, former assistant Secretary of War, on a delicate international mission for the President, Herrington's brief words to an audience of more than 1200 engineers were received with intense interest. In view of his prominent part in checking up on the Asiatic situation, his carefully measured words were pregnant with meaning and probably deserving of elaboration, if the times would permit. He said:

"The biggest surprise to greet me upon my arrival (after flying over 38,000 miles in two months) was the wave of optimism which seems to be sweeping our country at the present time. . . The confidence of ignorance is the essence of that which has brought many of the world's countries to their present plight. The hope that this war can end this year is not based upon observable facts. Any such conclusion cannot be supported from an actual survey of the military situation in the field.

"The most hopeful thing which I

RIGHT or WRONG?



... TEST YOUR KNOWLEDGE OF "ACORN" DIES

HERE are 12 questions about "Acorn" Dies. Out of 7 tool foremen who recently tackled them, only one was able to score 100%. How about you? Don't peek at the answers in the lower right corner till you've checked your knowledge.

1. "Acorn" Dies can be used on all makes of hand or automatic screw machines, turret lathes, bolt cutters, drill presses, etc.
☐ Right ☐ Wrong
2. "Acorn" Dies can only be used on fixed centers.
☐ Right ☐ Wrong
3. "Acorn" Dies are adjustable.
☐ Right ☐ Wrong
4. "Acorn" Dies do not require lead screws on machines on which they are used.
☐ Right ☐ Wrong
5. "Acorn" Dies can be used on any machines which reverse either the die or rod when the desired thread length has been cut.
☐ Right ☐ Wrong
6. There is only one size of "Acorn" Die blank for all thread sizes.
☐ Right ☐ Wrong
7. There are standard holders which permit "Acorn" Dies to be used with "button," spring or floating die holders.
☐ Right ☐ Wrong
8. Smaller than ordinary "Acorn" Dies can be used with a given holder.
☐ Right ☐ Wrong
9. Each size of "Acorn" Die holder is available with only one size shank.
☐ Right ☐ Wrong
10. Genuine "Acorn" Dies have an exclusive patented "heel" on the cutting lands that prevents tearing threads on reversal.
☐ Right ☐ Wrong
11. "Acorn" Dies are so uniform in size that they can be removed for sharpening, or changed without checking machine set-up.
☐ Right ☐ Wrong
12. A special fixture is needed to hold dies for sharpening.
☐ Right ☐ Wrong

For years "Acorn" Dies have hung up amazing records on various types of production work. Consider them for any job where dies seem to wear out rapidly.

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"Acorn" Dies are furnished in 5 different sized blanks.



Regular "Acorn" Die holders for screw machines that reverse die or rod automatically.



Releasing "Acorn" Die holder for hand screw machines.



"Acorn" Die Adapter, for button, spring or floating holders.

This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

GREENFIELD

TAPS • DIES • GAGES • TWIST DRILLS • REAMERS • SCREW PLATES • PIPE TOOLS

- | | | |
|----------|----------|-----------|
| 1. Right | 5. Right | 9. Wrong |
| 2. Wrong | 6. Wrong | 10. Right |
| 3. Right | 7. Right | 11. Right |
| 4. Right | 8. Right | 12. Wrong |

find upon arrival is that the President of the United States and his immediate advisers are so fully abreast of the situation before us that they certainly have no illusions concerning it. . . There can be no peace hereafter unless we now recognize that the principle of empire and the economic exploitation of the right of peoples must be brought to an end. . .

"We are fated to be the leaders of the new world. The time has come for us to assume this leadership. . ."

HERRINGTON, an intimate of many who are playing leading roles in the war, called attention to thoughts expressed by some of the leaders, especially a recent article by Madam Chiang Kai-Shek in the New York Times, April 19; the recent speech of Vice-President Henry Wallace delivered at New York on May 8th; and the Memorial Day speech of the Under-Secretary of State, Sumner Welles. Of these he said:

"It seems to me that these three statements, coming from individuals high in the councils of the United Nations, will give you a far better indication than I can, in my limited time, of the direction in which we are traveling."

A new story about Detroit's Bill Knudsen cropped out at this engineering meeting during an address given by T. P. Wright, assistant chief of the Aircraft Branch, WPB. The story indicates General Knudsen's direct approach to a problem, one that marked his automotive career as well. Quoting Wright:

"After inspecting a new alu-

minum plant just getting under way near Portland, Ore., and finding the construction work going slowly, he returned to that city to be greeted by a large gathering, headed by the Mayor, who were paying their respects to Crown Prince Olaf and the Princess from Norway. While conversing with the Prince, whom Knudsen knew well, the Mayor stepped up to the group to inquire as to the progress of the new plant, and to ask if there was anything he could do to help.

"'Yes,' said General Knudsen, 'get me 25 bricklayers. We need them badly up there.'" The Mayor was nonplussed but he got the bricklayers for Knudsen.

Declaring that we have only begun to produce, Wright said that if Hitler and his propaganda satellites could see our aircraft production delivery figures and tour a few of our fifty-odd airplane, aircraft engine and propeller factories, his scorn and disbelief would turn to astonishment, bewilderment and fear. The foreign production effort is flattening off at its peak, while ours is climbing steadily month by month, toward a peak three times the current output, Wright declared.

An increase in the number of women workers in the aircraft industry is admittedly on the way, but Wright is the first to provide any gage by which the total number can be estimated. He declared that last October the percentage of women workers to the total was but one per cent in the airframe industry, with a negligible number in engines and propellers. Now the percentages are nine per cent for

airframe, five per cent for engines and three per cent for propellers, with some companies in those categories employing 25 per cent, 15 per cent, and five per cent respectively. He declared that these figures eventually will go to 40 per cent, 20 per cent and 10 per cent on the average in airframe, engine and propeller plants, respectively. At present, employees average about 50 hours per week, with plant utilization approaching 110 hours for engines and propellers and 88 hours per week for airframes. These utilization figures are expected to increase as unbalanced material conditions are overcome.

A change in emphasis in problems has occurred in the aircraft industry since 1941 when the principal problem was tooling. In 1942 the industry is most concerned with materials, and in 1943 it will be concerned with materials and labor.

Of occasional instances in which airframe plants are working at reduced speed in the midst of a production drive effort, Wright declared that this reflects a determination to acquire a balance in production. He predicted that there may be an increasing pressure to deliver replacement parts, even at the expense of fewer deliveries of completed aircraft, since a reconditioned airplane at the scene of action is more valuable than a new airplane 8,000 miles from the front.

The extent and increase of subcontracting in the aircraft industry was cited by Wright, who declared that the average for airplane companies in March, 1941, was 13 per cent. This increased to 24 per cent by October, 1941, and to 36 per cent in March, 1942. Government assembly plants now getting into operation will resort to subcontracting to the extent of 60 to 80 per cent, he said. Thirty per cent is a fair average of the industry, not counting the government assembly plants. In general, he declared, it is undesirable to subcontract the fuselage and center section wing panel away from the assembly plant.

Wright predicted that the aircraft production and delivery curve will be consistently concave upward, with no flattening for many months to come. A year from now, both in rate of production and air force total strength, the United Nations will predominate by two-to-one over the Axis powers.

GENERATOR SUPPORT: This giant mirror-like iron casting will support 2 million lb. of rotating machinery in a 108,000-kva. Westinghouse generator for Grand Coulee. The finish resulted from completely machining, lapping with abrasive compound, and polishing. This 8 ft. thrust runner plate weighs 9700 lb. is 6 in. thick, and has a 38 in. bore.





McKee is helping produce the means to
Provide for the Common Defense

THAT phrase, from the Constitution of The United States, places a vast responsibility on America's Iron and Steel Industry.

The first necessity of modern warfare is steel — steel for the ships and tanks and guns and planes essential to victory — steel for shells and bombs and torpedoes — steel for the machines that produce them.

The McKee organization is playing a major role in the Iron and Steel Industry's war effort by providing means for the increased production required.

The new facilities designed and constructed by McKee during the past five years alone represent a substantial increase in iron and steel plant capacity for wartime production.



Arthur G. McKee & Company

★ *Engineers and Contractors* ★

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ROCKEFELLER PLAZA
NEW YORK, N. Y.

COMMERCE BUILDING
HOUSTON, TEXAS

Washington . . .

• Government's threat to request direct scrap dealing by steel mills might not prove helpful . . . Complications are many, headed by labor shortage which would hamper mills.



WASHINGTON — By coincidence the Government and the American Iron & Steel Institute Scrap Committee are about to inaugurate nation-wide salvage campaigns. The Government, as announced by President Roosevelt last week, is going to comb the country for scrap rubber. Specifically its immediate purpose is to learn the exact situation with respect to the shortage of rubber. Based on the survey, the Government will establish a policy. Depending upon whether the collection uncovers more or less scrap rubber than the widely varying estimates of supplies indicate, rationing will be liberalized or tightened. But it is definite that the civilian will do much less riding on his own tires for the duration, regardless of the availability of gasoline.

The President, who expressed the hope that the collection can be completed within two weeks, warned that if full cooperation is not forthcoming, the Government will be forced to take summary action. It may be remarked in passing the failure of previous salvage campaigns of which that concerning aluminum is an example, was due to unintelligent Government performance, which

it is hoped will not be repeated. The response by the people has always been splendid.

THE Institute Committee's campaign is of a different kind from the Government plan to gather old rubber. Like the Government campaign it is national in scope, but unlike the Government, the Committee's plan is to turn to printer's ink to educate the public. It has no power and unquestionably does not want power to take summary action if cooperation is not afforded. It proposes to make a written appeal to the public, emphasizing the acute need of gathering old material for the war effort. Its campaign is broader than that of the Government in that the Committee, acting for the iron and steel industry, will seek to recover a wide range of products that an extravagant nation ordinarily discards as being useless. Of exceeding value in this desperate war struggle these "waste" commodities include iron and steel scrap, rubber, non-ferrous metals, tin cans, cooking fats, etc. For the iron and steel industry its chief interest is in the collection of ferrous scrap. But collection of old materials is only the beginning of the job. These materials indeed are wastes until they are prepared and transformed into finished products. Therefore the channels for this processing are vitally important.

The Government will turn its old rubber to established tire manufacturers for preparation before fashioning it into new tires. This is the quickest and best way to have the work done and time and quality are of the essence. The Government is not going to establish its own facilities to prepare salvaged rubber and then turn it into new products. At least if the idea is implanted in the minds of the planners they have not tossed it to the public.

YET in the field of preparing iron and steel scrap, Lessing J. Rosenwald, chief of the WPB Bureau of Industrial Conservation comes out with a statement in which he strongly suggests that steel manufacturers pass up

iron and steel scrap dealers by buying and preparing scrap in their own yards. The steel industry in its campaign to stimulate the collection of old material does not have in mind the matter of buying and preparing its own scrap. Just as the Government proposes to have old rubber processed by established private manufacturers, the iron and steel industry intends to continue channeling its scrap through established dealers. This is the quickest and best way.

The Rosenwald statement that "The threatened bottleneck

Executives can assist the drive for more scrap and at the same time help themselves to more steel, says J. H. Van Deventer, president and editor of THE IRON AGE, in this week's editorial, page 39.

(which he says exists in scrap dealers yards) can be eliminated if the mills buy and prepare scrap in their own yards and it may be necessary to see that this is done unless the usual methods of scrap handling can deal with the problem," won't stand analysis. The "forcing" of the Government to request steel mills to buy scrap direct has broad implications even aside from that of Government coercion, the very thing that has made it necessary to fight the Axis powers.

THE bottleneck would become worse if the Rosenwald suggestion were effectuated. It is not only scrap dealers who complain of labor forces being depleted by the draft. The steel and other industries are making the same complaint. This condition is a concomitant of war. For the steel industry to do its own scrap preparation and grading would only intensify its labor shortage. For it would have to take on new labor. Its present mill forces, already deficient in number, could not take up the work of operating scrap yards. More than that the industry would have to buy new equipment in a market of equipment shortages and this in itself would call for more labor in a market of labor shortages. And there would be delay in getting and installing the equipment and

TAKE *Guesswork* OUT OF PRODUCTION



Put **SUNOCO EMULSIFYING CUTTING OIL** to work . . . for long tool life . . . accuracy . . . fine finish

Victory production — the steady stream of machined parts for finished war products — isn't achieved by guessing. The selection of the proper tool set-up, correct speeds and feeds, and the right application of the right cutting lubricant are all important for machine tool operation at rated capacity-plus.

That's why so many leading plants throughout the nation rely on Sunoco Emulsifying Cutting Oil and the recommendations of Sun Oil Engineers to meet their cutting oil needs.

Sunoco's exceptional heat-absorbing and lubricating qualities permit longer tool life,

"nth" degree accuracy, and fine surface finish. Sun Oil Engineers — those capable Doctors of Industry — offer you technical service based on scientific training and practical experience that will help you solve your machining problems. Their recommendations are not guesswork. They stand ready . . . willing . . . and able to help you in your plant. For helpful case histories on how they aided other leaders in the metal working industry, write for your free copy of "Helping Industry Help America."



SUN OIL COMPANY • Philadelphia, Pa.
Sun Oil Company Ltd., Toronto



PERFORMANCE DATA

OPERATION — Tapping ring nuts.

MACHINE — 3-L Gisholt Turret Lathe.

MATERIAL — Forged steel.

CUTTING LUBRICANT — 1 part Sunoco to 15 parts water.

SUNOCO

SUN PETROLEUM PRODUCTS

HELPING INDUSTRY HELP AMERICA

time, like equipment, is short.

There are other complications, some economic and some of a character that would slow down the war effort.

Here are a number of difficulties:

For a large company it would be necessary to spend \$200,000 in shears, torches, cranes, presses, etc.

Steelmakers would find they would have to pay workers in their own scrap department hourly wages commensurate with wages paid workers in other divisions, ranging from common labor at 72½¢ to semiskilled and skilled rates. These wages compare with hourly rates of 50-55¢ in established scrap yards. Steel mills' compensation insurance rates would be increased because of the hazardous nature of the scrapping business.

Steel mills in buying unprepared scrap necessarily would work off grades that they could not use. Hence a steel mill would become a seller of scrap and thereby become subject to a lot of regulations and restrictions.

Steel mills also would produce and consume electric furnace and foundry grades that otherwise

would be sold by the regular scrap dealer to the electric furnace and foundry operators. The result would be that electric furnaces and foundries would be faced with scrap shortages that otherwise did not exist.

Steel mills also would have to handle and merchandise a lot of non-ferrous scrap that it cannot use.

As has been pointed out by Edwin C. Barringer, president and executive secretary of the Institute of Scrap Iron & Steel, Inc., a subcommittee of the House committee last month recommended that normal processes and procedures for handling scrap be permitted to continue under the "qualified leadership of established trade agencies."

The recommendation is sound and should be accepted.

Simplified Practice Guide Covers Standard Packages

Washington

••• The Bureau of Standards says that conservation of a large quantity of metal and other materials is expected to result from a new simplified practice recommen-

dation covering standard packages for shortening, salad oil and cooking oil just approved by the industry. The recommendation, R-193-42, effective July 1, provides for the elimination of certain uneconomical package sizes and the use of substitute containers.

The recommended standards are as follows:

SHORTENING CONTAINERS AND PACKAGES

Type of Container	Size of Package (Pounds)	Number of Packages per Case
Tierces	...	...
Steel drums	400 (approx.)	...
*Can (black iron)	110	...
*Can (black iron)	48	...
Pail (black iron)	8	6
Carton	4	12
Carton	1	48
Can	6	6
Can	3	12
Can	1	36

*May be used for both standard and hydrogenated products.

SALAD OIL AND COOKING OIL CONTAINERS AND PACKAGES

Type of Container	Size of Package	Number of Packages per Case
Steel drums	400 lbs. (approx.)	...
.....	5 gals.	1
.....	1 gal.	6
.....	½ gal.	12
.....	1 qt.	12
.....	1 pt	24

Perforated Cover Plates Contribute to Strength

Washington

••• Tests made at the Bureau of Standards have demonstrated that perforated cover plates for steel columns contribute to the strength, and especially to the stiffness, of columns, and that the holes in the plates do not weaken them unduly, according to the Department of Commerce.

This work was undertaken following suggestions that considerable quantities of steel could be saved for use in vital military equipment if perforated cover plates were substituted for the lattice bracings or battens ordinarily used to join the two solid members of built-up columns for bridge trusses.

The open construction necessary to permit access to the interior of the column for inspection and painting is usually assumed to contribute little or nothing to its strength and stiffness. It was stated that the tests made at the Bureau refute this theory. It was carried on in cooperation with the American Institute of Steel Construction.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



BLANCHARD

**CHECK THESE
ADVANTAGES
OF BLANCHARD
GRINDING**

★ **Production**

★ **Adaptability**

Fixture Saving

Operation Saving

Material Saving

★ **Fine Finish**

★ **Flatness**

★ **Close Limits**

..... *Especially
valuable on jobs like
the one illustrated.*

"PUT IT ON THE BLANCHARD"

**FLAT
WITHIN .000007"**

Here are semi-cast steel compressor heads being ground on a No. 11 Blanchard Surface Grinder to the almost *unbelievable flatness of .000007"*—(that's seven millionths of an inch). The finish measures 6 micro inches. Yet this is a regular production job in a leading electrical products manufacturing plant. The heads are 7" in diameter and 3³/₄" thick. .005" of stock is ground off one surface. Production averages 40 parts per hour.

Fast, accurate and easy to operate, this smallest Blanchard Grinder has proved to be profitable for either tool work or small lot production.

Send for your copy of the No. 11 catalog today.

*Grinding compressor heads on the No. 11
Blanchard Grinder*



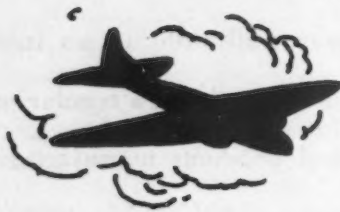
Send for your free copy of "Work Done on the Blanchard." This book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE, MASS.

WEST COAST . . .

• Record breaking launchings at some yards reflect old story of simplification, mass production . . . Ships of more complicated design are slower to come off ways . . . Shortage of machinery hampers coast builders.



SAN FRANCISCO—The secret of recent record-breaking launchings and deliveries of emergency cargo vessels by Pacific Coast shipyards lies as much in co-ordination of material deliveries as in assembly.

Not far from one of the yards which launches a hull almost every week is another yard which has not delivered a ship this year. No one familiar with the situation has even hinted that this second yard is inefficiently managed, and some even go so far as to say that its cost factors are probably lower than the speed burner. Nor is the failure to deliver vessels due to slowness or slackness in fabricating or assembling.

Without exception, the shipyards which are in the headlines these days for their phenomenal speed in launching hulls and outfitting them are engaged in constructing emergency cargo ships, vessels standardized to the last detail and duplicated exactly in all parts of the country.

When the Maritime Commission embarked on its emergency ship program, the backbone of which is hundreds of EC-2 cargo vessels (known as "ugly ducklings" before the phrase was found objectionable) construction was concentrated chiefly in yards created especially to build this single type of ship. The phenomenal speed with which these freighters are being built lies partly in new yard layouts and able direction, but in no small part it is the old story of mass production

all over again—simplification and specialization.

Henry J. Kaiser announced last week that if all American shipyards would adopt the method of one of his shipbuilding plants, the United States would construct 400 ships per month. His statement does not tell the whole story. He might have gone on to say that this could only be accomplished if American yards were restricted to production of one or a few simplified types of vessels in yards specially constructed to produce them, and employing mass production methods.

Although the EC-2 and its British predecessor, upon which the fine record of the Kaiser yards is based, are performing excellently in the service for which they were designed, neither the Maritime Commission, the Navy, or Mr. Kaiser, himself, would assert they are the only type of ship America needs to win the war. In the current Maritime Commission construction program in Pacific Coast yards, C-1's, C-2's, C-3's, and C-4's—all part of the long range program—as well as tankers, small single screw coasters, tugs, and concrete and wooden barges are represented, with wooden vessels in prospect. This does not take into account the Navy's program for various types of combat vessels and auxiliaries.

THESE vessels, rightly or wrongly, are of highly complicated design. They are not being built in large quantities because large numbers of them are not required. Construction of some of them is almost a custom proposition.

The yards which are building them will not shine in the picture magazines, no matter how good a job they do.

Although the public mentality seems to be conditioned to shuddering at steel shortages, tremendous progress has been made within the last six months on this problem so far as Pacific Coast yards are concerned. Particularly in the early, explosive stages of the emergency ship program, when new yards were being opened up almost weekly, there was both an actual shortage of steel and extreme difficulty in obtaining deliveries from the mills in proper sequence. It would

be inaccurate to say that these difficulties have been eradicated, but both supply and scheduling have greatly improved.

For instance, at this writing, only one Pacific Coast yard is delaying a keel laying because of lack of steel required in the immediately subsequent stages of construction, so far as can be determined. Six months ago at least a half dozen Coast yards swung their heels for this reason. Shortage of steel now might be more properly classified as a factor delaying expansion of the current program rather than delaying the program itself.

Launching records don't tell the whole story. The headache period now for most Coast builders lies between launching and delivery. Lengthiest and most disturbing delays are due to inability of machinery manufacturers to meet delivery schedules. Your fingers are not sufficient to count the number of hulls lying at Pacific Coast outfitting docks which cannot be delivered because of lack of necessary machinery or parts.

Yards with the biggest problem are those which convert cargo vessels to other uses. Designs are not standardized. This makes it impossible to order materials so that they will arrive in one-two-three order. The yard previously mentioned which has not delivered a ship this year is extensively engaged in conversion work on vessels which never were completed as originally designed. Extreme difficulty is experienced in getting deliveries on materials ordered only as required, even with the highest priority ratings. This is at least one case in which steel warehouse stocks are sorely missed.

The Boeing-Vega-Douglas tripartite manufacturing agreement on Flying Fortresses officially became two-thirds effective last week with the announcement by Vega that it has gone into production on these big bombers six months ahead of schedule. Courtlandt S. Gross, president of Vega, said his company was fully launched into what he described as an "accelerated production schedule" on the B-17 F's. Vega, Mr. Gross said, is still producing Vega Ventura twin engine bombers for the British and is also ahead of schedule on these. Messages from high military officers to plant workers describ-

WHERE *Precision* IS PRICELESS



YES, it's a comparatively small part—a cylinder hold down stud—only one of many threaded hardened pieces that go to make up the powerful engines of today's fighting planes . . . small but vital parts that must be precision-machined if

they are to endure the stress that's unavoidable in modern airplane engines . . . this stud (with threads on both ends, tapered and straight, precision ground from the solid after heat treat) is typical of thousands of hardened parts being threaded on a production basis day and night for the aircraft industry . . . on Ex-Cell-O thread grinding machines . . . to the highest commercial standards of accuracy in size and finish.

EX-CELL-O CORPORATION • DETROIT, MICH.

The modern precision thread grinder is an Ex-Cell-O accomplishment, introduced by Ex-Cell-O to American industry in 1935. There are nine styles of Ex-Cell-O Precision Thread Grinding Machines, covering an extremely wide range of work for both external and internal threads. Below is Ex-Cell-O Style 33 Automatic (used for production of precision threaded hardened stud shown above).



XLO

EX-CELL-O means PRECISION

Precision THREAD GRINDING, BORING AND LAPPING MACHINES,
TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES,
BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

ing performance of planes which the workers have built, and visits of military heroes to the plants themselves, apparently have acted as a definite stimulus to production. At the time such messages and visits were originally recommended by labor relations men of southern California aircraft plants several months ago, such methods of stimulating production were greeted with skepticism. The old American theory that "a job is only a job" apparently became less firmly embedded with the declaration of war, and actual contact with the men who use their products personalized the need for increased production to the workers.

Still another personnel trend which a year ago lacked credibility was confirmed last week by Consolidated Aircraft in the announcement that it is now hiring six women for every four men. Approximately one-seventh of the entire Consolidated working force at San Diego now is women. That the trend has by no means run its course is demonstrated by a survey of pre-employment training which shows that classes are composed of 80 per cent women. T. M. Girdler, Consolidated board chairman, late of the steel industry, estimates that within a year women will represent

30 per cent of the total payroll.

The hiring of women in San Diego has as a bonus factor the decreased need for additional housing accommodations in a city where crowded living conditions have made a net population increase undesirable. If the factories can persuade workers' wives and families to join the payroll, it makes for more efficient use of existing housing.

That women do not constitute a bottomless labor reservoir is recognized in the call for elderly, retired men to join the Consolidated staff.

Consolidated's assistant employment manager, H. E. Pafek, declares that "undoubtedly many men living in retirement here have manufacturing and engineering background of extreme value to aircraft plants these days. The work they would be qualified to perform is not heavy manual labor. It's their brain power we are after and we don't care if a man is 65 or 70 as long as he knows something about toolmaking, tool designing and general engineering."

Despite the threat of federal inventory restrictions, members of the Purchasing Agents Association of Northern California reported last month in a survey that a declining trend in inventories in

recent months had been arrested. Fifty-nine per cent of the members reported May inventories higher than a year ago. This compares with 56.3 per cent who reported higher inventories than a year ago in April. Of those reporting in May, 11.5 per cent said their inventories were the same as a year ago, and 29.5 per cent said they were lower. Compared with a month ago, however, 14.1 per cent said their inventories were higher, 51.3 per cent said they were the same, and 34.6 per cent said they were lower. A number of the Association members are not affiliated with metal working industries, and the surprising inventory check may be an indication that metal inventories have scraped bottom while those firms who purchase non-critical products are able to take advantage of expanded production.

Recapitulation of strike statistics for 1941 announced by the U. S. Bureau of Labor Statistics last week shows that San Francisco and the East San Francisco Bay area, which may be considered as an industrial unit, lost 614,160 man-days, ranking third in the nation after New York and the Detroit area. Los Angeles was eighth on the list of industrial areas with 162,125 man-days lost, Portland was twelfth with 145,715, while Seattle, a thoroughly unionized town, only lost 35,686 man days.

More than half of the man-days lost in the San Francisco area were during the machinists' strike against the nationwide shipbuilding stabilization agreement.

NEW TANKBUSTER IN ACTION: This armored tankbuster carries a large calibre anti-aircraft gun mounted to shoot straight ahead. The car is on a half-track. This is one of the first units of its kind with the gun pointing forward.

Acme Photo



New York "L" Cars to Be Used to Haul Coast Workers

San Francisco

••• One hundred electric cars which formerly operated on New York's elevated railways will be brought to this region to carry workers five and one-half miles from the end of present rail facilities to the Richmond shipyards of the Kaiser group. Five and one-half miles of new track will be laid. Following a recent California railroad commission survey showing that 75 per cent of the workers drove their own cars, the Maritime Commission interceded to obtain federal funds with which the rail extension might be built. Eventually it is expected that the 70,000 men to be employed in the three shipyards will use the line.

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YOUR PLANT MATERIALS

TRUSCONVEY means the quick, Johnny-on-the-spot movement and delivery of parts and materials—from neat, orderly, easy-to-get-at points throughout your plant—with the aid of strong, efficiently-designed Truscon Steel Boxes and Skid Platforms.

• Now, to meet wartime needs, your plant must be geared up to production schedules never before required. That means *faster* action, *less* waste motion, *more* efficient work in each and every one of your manufacturing steps. • You can help meet these new requirements of your plant by permitting us to study your handling operations and requirements. We then can make well-planned recommendations exactly suited to your needs, embodying Truscon Steel Boxes and Steel Skids designed to fit your individual needs. • Throughout America, Truscon Materials Handling Equipment is simplifying operations and speeding production. Its ability to stand up year after year despite hard service and adverse conditions, has proved that in the long run it is the cheapest and most profitable equipment. • Learn to say **TRUSCONVEY**—learn the many benefits you will receive from Truscon Steel Boxes and Steel Skids—write us for illustrated literature today, and ask for a plant survey without obligation.



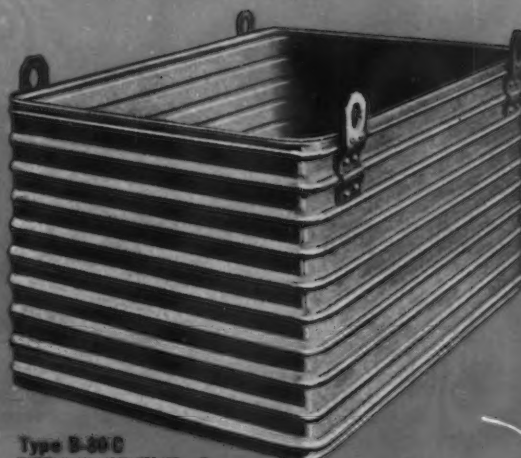
Investigate **TRUSCON** Foundry Flasks

Light weight . . . durability . . . strength where strength is needed . . . easily rammed and shaken out . . . these are features of economy and production you get in **TRUSCON** foundry flasks. Write for descriptive literature on complete line.

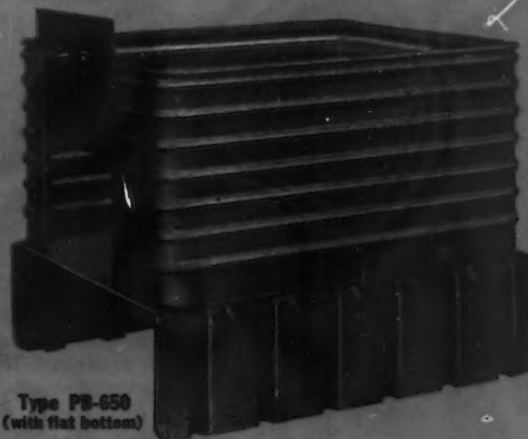
Truscon

MATERIALS HANDLING EQUIPMENT

Truscon Steel Co., Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio. Subsidiary of Republic Steel Corporation.



Type B-80C
(with corrugated bottom)



Type PB-650
(with flat bottom)

Type PB-150
(without flat bottom)

YOU'LL FIND IT WILL PAY TO **TRUSCONVEY** YOUR PLANT MATERIALS

Fatigue Cracks

BY A. H. DIX

Slang with Crow's-feet

• • • With the country's best minds gathering at Washington the way Magnaflux powder collects over a crack in a crankshaft you would think the country's cerebral center would spawn sparkling phrases as proliferantly as bacteria breed in a beef broth medium. But so far the Capital's contributions to the enrichment of the language are piddling.

The slang used is wholly prewar. According to OPA's Dexter Keezer, the expressions most commonly heard are "Give it the green light," which means, of course, "speed it on its way;" "this is strictly graveyard," a variant of "keep this under your hat;" "call your shots" and "spell out," both of which have several meanings. All are well worn.

Washington's most notable contribution to the language is an exhumation. "Directive" has been dug up and put on three shifts. We thought its role as a noun was new, but it appears as a noun in our old word book, so it is etymologically adult. "Directive" is a useful word, and congratulations to him who wire-brushed the rust off and put it back into circulation.

Civil War Wisecrack

• • • Washington has been slow even in hatching wisecracks. We have seen nothing yet that matches one born during a previous war, as reported in Margaret Leech's excellent "Reveille in Washington." A Maryland national guard outfit known as the Something-or-other Invincibles disbanded as soon as the Civil War began, prompting a wit to remark, "Invincible in peace, invisible in war."

Blurb

• • • As only manufacturers with war goods contracts are eligible for Navy E's and Army A's, it would be nice if the government would think up some kind of an award for others who are rendering distinguished service in the production war effort.

We are thinking mainly of your favorite family journal, regarding the value of whose contributions we need have no false notions, considering the stack of unsolicited and unangled for tributes from arsenals, navy yards, other departments of the government, and private materiel producers.

Of our latest major offering, the sixth edition of the Priorities Guide, a WPB executive says, "It has been a marvelous help in speeding up my reference work." A machine tool builder says, "Our v.p. immediately found information there for which he had been looking elsewhere extensively but unsuccessfully." The War Supplies Procurement Division of an allied nation says, "We have found it of great value." Others say, "It is the best summary we have seen of this very perplexing problem"—"This is the best and most useful."

The demand for additional copies has put our shipping room on two shifts.

Prophecy

• • • Bob Blair, who is half of the business department's Ohio task force, reports that a manufacturer in his territory has appointed a vice-president whose duties consist solely of postwar planning. His title is "v.p.-in-charge-of-thinking-about-tomorrow."

We would like to be able to give him a rough idea of how long he will have to think. The general estimates that the war will last anywhere from six months to twelve years are not sufficiently close for accurate planning. Therefore, we are glad to offer the opinion of a Los Angeles manufacturer who seems to have inside information. He writes:

Please take us off your mailing list for the time being. We are closed for the next three years.

Stoppers

• • • We put the kids to bed in 1865!—Dunbar Bros. Co.
The most metrical headline of the year is Waugh Laboratories' "He feels the balanced rhythm in a spinning motor's song."

Lifeline Guaranteed for a Lifetime

• • • Speaking of glimpses into the future, Sam De-Wolf, our Pennsylvania shepherd, tells us that a sign on the Lincoln Highway, between Lancaster and York, reads: "Madame Olga, Palmist—Readings Guaranteed."

At first glance the sign seems to guarantee your future as read by the Madame, but literally it merely warrants that your palm will be read. If, however, the seeress is without guile, she is still reasonably safe. For if she interprets your lifeline to read that you are good for another thirty years, and over-reaches by five or ten, obviously you will not be present to claim a refund.

If on the other hand you outlive your allotted thirty years, your joy over making a liar out of your lifeline would doubtless estop you from asking for your four bits back. So the odds are fixed well in favor of the house, as in the case of another eastern Pennsylvania prophet who will predict, upon payment of one dollar, the sex of your next child—money refunded if he is wrong.

We Meet the Great

• • • Reader's Digest writes us:

"Your subscription has expired. It seems a shame to remove your stencil from the good company it is now keeping. In the same file with it are the stencils of Lawrence Tibbett, Bernard M. Baruch, Cornelia Otis Skinner, Sinclair Lewis, Helen Hayes, and thousands of other distinguished people . . ."

Our amour propre is increased enormously by the knowledge that we have been feeding from the same trough of mental pabulum as these great ones. But the selection puzzles us—a singer, a financier, two actresses, and an author. No manufacturers, no statesmen, no scientists, no bankers, no publishers, no screen stars, no lawyers, no merchants, no educators, no meat packers.

It is comforting to feel that if we should ever meet Tibbett, Baruch, Skinner, Lewis, or Hayes we could say, "We, too, are a reader of Reader's Digest." But the odds are too great. We would prefer a greater selection. However, we would go back in a flash if the Reader's Digest people would disregard their alphabetical arrangement and put our stencil right smack against Rita Hayworth's.

Puzzles

• • • Last week's cows had enough grass to last for 15 weeks.

The problem that has caused the most excitement so far this year, excluding the war, of course, is the one sent in by C. W. Schuck—"What number consisting of eight digits, beginning with 1 and ending with 9, when multiplied by 9 yields a product the sum of whose digits is equal to 9?" When we ran it we thought there was only one answer—12,345,679 times 9 equals 111,111,111.

John A. Davenport of the U. S. Eng. Office, Cincinnati, says there are at least 765 answers, W. C. (Wheeling Steel) Marshall sends in seven, B. W. Hawkins, Marjorie Frazee, Wm. R. McEwan, John L. Christie and E. A. Wahlers send in one each, and a Jones & Laughlin anonym sent in an eight-page letter, listing 1617 right answers. As reported last week, A. H. Baum says there are 111,112 solutions.

We find that it is almost impossible not to get the right answer, as you can fill in any six digits between the 1 and the 9, provided they are not in descending order. It works on every combination from 11,111,119 to 18,888,889. You need not even start with 1. You can begin with any digit except 9, multiply by 9, and the sum of the digits in the answer will be 9. Uncanny, we call it.

Two minutes is par for this one submitted by Miss Jane I. Butzner of the brains department:

A man has 20 boards, each measuring 1 ft. wide and 6 ft. long. He wishes to construct a solid fence 6 ft. high, using all the boards, and of such shape that the area enclosed can be doubled with a minimum of additional boards. What shape should he build the enclosure and what is the smallest number of boards he will need to double it?

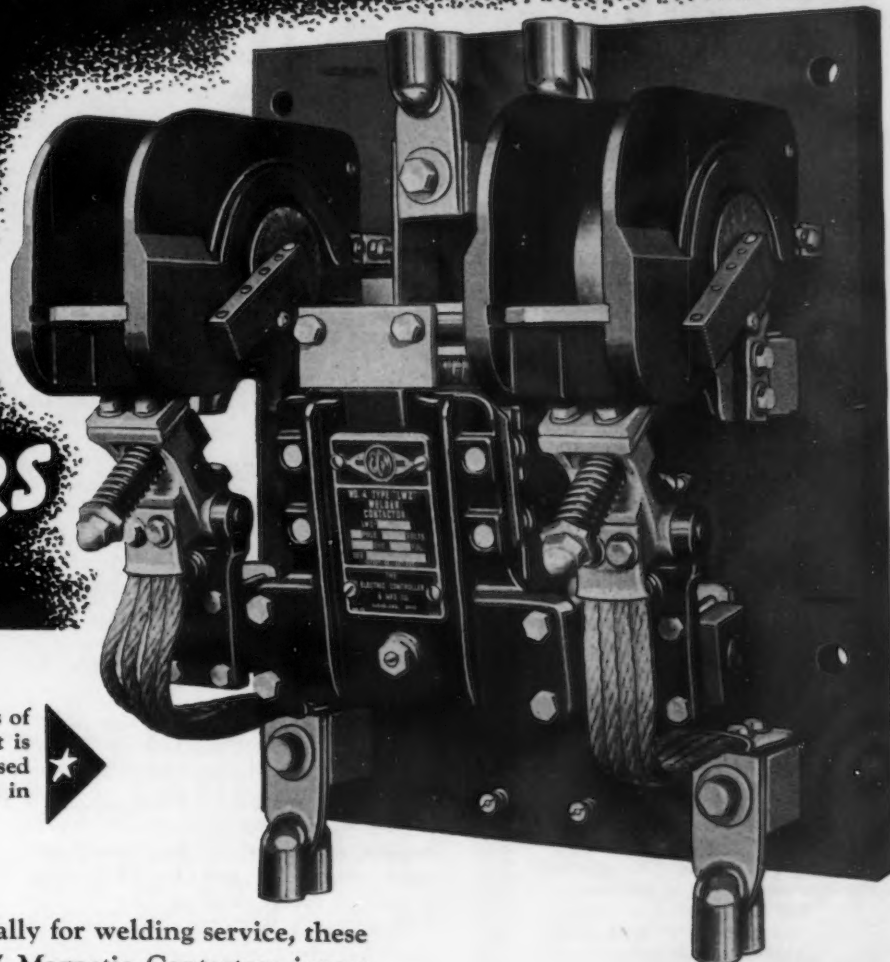
Hi-Speed WELDING

WITH THE

EC&M

TYPE LWZ

WELDER CONTACTORS



EC&M Builds six standard sizes of welder contactors. At the right is the No. 4W size. Ratings are based on duty cycle curves as shown in Bulletin 1211.



Designed especially for welding service, these heavy-duty LWZ Magnetic Contactors insure good welds at low cost. The readily accessible contact-adjustment permits high-speed uniform opening and yields consistent welding results.

All contacts are pure copper, cold-formed by a special process providing high Brinnell hardness throughout their thickness. Proper cushioning and skillful design eliminate bounce in both opening and closing. Continuous capacity operating coils are capable of frequent operation in welder service and are well suited for "heater" and similar applications where the contactor may be closed for a long period of time.

High in arc-handling ability, low in upkeep, these EC&M Type LWZ Contactors have no equal. Ask for illustrated Bulletin 1211.



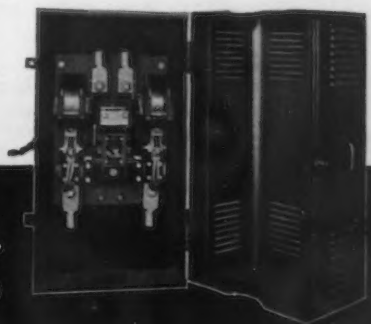
Convenient contact-adjustment makes possible consistent results through high-speed, uniform opening.



THE ELECTRIC CONTROLLER & MFG. CO.

2698 E. 79th Street

CLEVELAND, OHIO



Dear Editor:

THE MANAGEMENT BOTTLENECK

Sir:

I must take time out between government reports to write you expressing my appreciation of your editorial in the June 4 IRON AGE.

When the war started, I resolved to do anything I could to help win it. I would work with the superintendent to help him convert the plant from making fire place equipment, door stops, bookends, etc., into making war material just as quickly as possible. We wouldn't wait till we had to do it. We'd do it as quickly as possible. We didn't care if we made any money or not. In fact, we'd feel better if we didn't!

What happens? All the time from the regular routine work is spent making out reports. When there is a bunch of reports on my desk to make out, it seems to cramp my whole job, my whole life. I like to help develop the new war items out in the shop. I can't spend a minute out there. My job has been to give them encouragement out there—help them take the bugs out of jobs.

We can do a good job getting out war work—if they'll only take these darn reports off our necks. Perhaps this is part of the sufferings of war, but we'd rather be in the army.

L. D. SNYDER,
Secretary and Treasurer,
Littlestown Hardware &
Foundry Co., Inc.,
Littlestown, Pa.

Sir:

We are in receipt of our June 4 copy of THE IRON AGE with the Priority Section. This is a fine service which we appreciate. We have also noted Mr. Van Deventer's editorial "The Management Bottleneck," which is timely and sensible.

In times like these, management is under a special strain to cover the detail of labor and material, as well as conversion of regular products to more essential ones, and as the editorial stated, should not be turned into clerks compiling intimate data of the business which seems to be obligatory now. Small plants cannot afford a force capable of correctly making these reports and even so, the management would have to train such personnel.

Of course, if this will help win the war—we bow our backs and go ahead.

SAMUEL T. STEEL,
Secretary-Treasurer,
Union Machine Co.,
Bartlesville, Okla.

Sir:

Your editorial, "The Management Bottleneck," seems so timely that we would like to have a few reprints, planning to attach one to each of the various questionnaires which we are

now sending in almost continuously.

JOHN S. CHAFEE,
Brown & Sharpe Mfg. Co.,
Providence

• Just a few?—Ed.

METAL SPRAYING

Sir:

Will you please send us the name of the company, or companies, whom we can contact in order to get detailed information in regard to Schori Powdered Metal Spraying Process?

C. L. HOLDERLE,
Holderle Brothers, Inc.,
Rochester, N. Y.

• We suggest you get in touch with the Schori Process Co., 8-11 43rd Road, Long Island City, N. Y.—Ed.

CHLORINATED SOLVENTS

Sir:

In THE IRON AGE of May 14, there is published an article entitled "Metal Cleaning." The sub-heading states that "shortages of chlorinated solvents bring metal cleaners face to face . . ." etc.

Can you supply us with the statistics or figures showing just how great is the shortage of chlorinated solvents at this time?

Second, can you give me the information what part or portion of the total chlorinated solvents production is used in metal cleaning?

How much of the total solvents used in metal cleaning can be reclaimed?

Just how correct is the opening paragraph where it states that the WPB recently stated that users of solvents for metal cleaning will have to provide substitutes, in spite of the fact that the work they are doing may carry high priority ratings?

In another part of this article you state that chlorinated solvents can be dispensed with to a great degree. This intimates that in certain instances chlorine solvents must be used. Is this contradictory to the opening paragraph? Further in the article you make the statement that the emulsion cleaning method is about 75 per cent cheaper than solvent degreasers.

Further, this statement is made—that the economies of the process with high production rates and improved cleaning will offset the cost of installing the necessary equipment.

May I also have the figures that will justify this statement?

JOHN M. BASH,
Phillips Mfg. Co.,
Chicago

• Statements made in the May 14 article were based on WPB release No. 399. We understand that the release has been widely misinterpreted

and that the present outlook is that the supply of chlorinated solvents for metal degreasing by plants engaged in war goods production will continue to be adequate. It is now obtainable on an A-10 rating. Some is even being rationed, on a 50 per cent of former use basis, to commercial dry cleaners.

For further information on the use of chlorinated solvents in metal degreasing, see page 64.—Ed.

B.A. AND B.S.F. THREADS

Sir:

We would appreciate it very much if you could give sources of supply for measuring wires for B.A. and B.S.F. threads.

A. RAKOVSKY,
General Manager,
Albert Rakovsky Precision
Works, Ltd.,
Montreal

• Among the manufacturers of measuring equipment for wires for B.A. and B.S.F. thread are Brown & Sharpe Mfg. Co., Providence, and Morse Twist Drill & Machine Co., New Bedford, Mass.—Ed.

KIRKSITE DIES

Sir:

In the May 28 issue of your magazine there is a very interesting article by Mr. G. A. Brewer on "Drawing Dies for Airframe Stampings."

He describes a Kirksite "A" die material as a substitute for steel or cast iron dies, and it would be appreciated if you could let us have the name of the producer of this die material.

F. V. FLECKINGER,
National Mfg. Corp.,
Plainfield, Conn.

• To secure this material you could communicate with Morris P. Kirk & Son, Inc., Los Angeles. This alloy is also procurable through the various branch plants of the National Lead Co., New York, and alloys which perform somewhat similarly are sold through New Jersey Zinc Sales Co., New York.—Ed.

COKE

Sir:

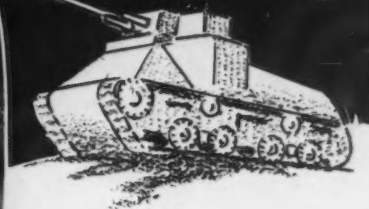
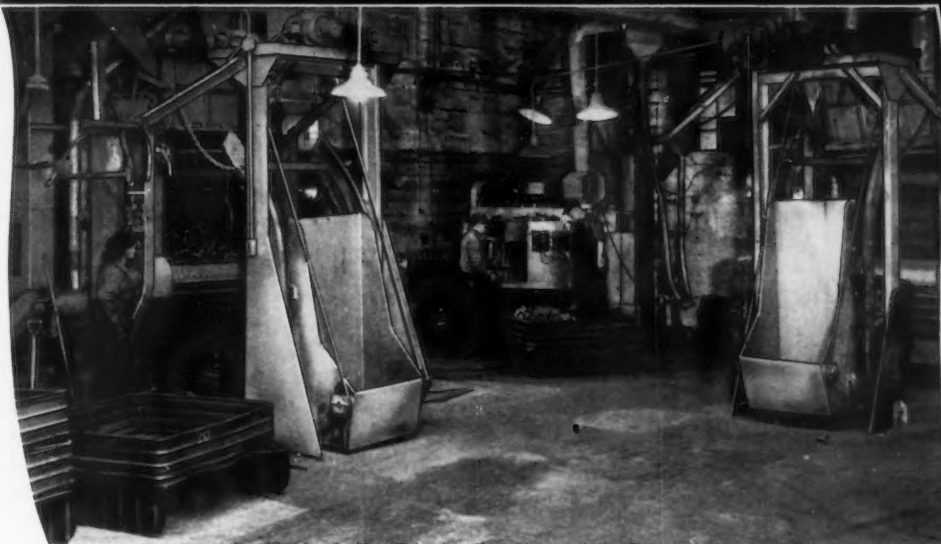
We own a battery of bee-hive coke ovens which will require rehabilitation of plant and equipment, before being placed in operation.

As your organization is an authority on this and kindred matters, we will appreciate an expression from you as to whether or not additional tonnage of furnace and foundry coke is needed now or may be needed later.

O. W. MILLER,
Sales Manager,
Oklahoma Coke Co.,
Howe, Okla.

• Due to the extremely tight situation in coke supply, we would think you should find a very ready market for your product.—Ed.

Helping AMERICA Speed the Day of Victory with **WHEELABRATOR** Speed Cleaning



HERE'S HOW IT'S BEING DONE with the **AIRLESS WHEELABRATOR**

TIME is Saved—The WHEELABRATOR saves precious minutes and hours on every job it tackles. Time is saved after cleaning, too, because inspection is simplified, and machining and grinding operations are speeded up, due to the sand-free quality of WHEELABRATOR cleaning.

POWER is Saved—the WHEELABRATOR effects important savings in horse power—often as high as 80%.

TOOLS are Saved—WHEELABRATORS clean products so thoroughly that cutting tools require fewer changes and less frequent grinding.

LABOR is Saved—WHEELABRATORS require fewer operators, thus releasing manpower for other work.

SPACE is Saved—WHEELABRATORS minimize cleaning room space not only because they are compact but because they handle more volume per machine in a given period of time.

MATERIAL is Saved—Breakage is a bugaboo at any time, especially now, because it means wasted effort and reduced output. With a WHEELABRATOR this difficulty is reduced to a negligible minimum.

EQUIPMENT is Saved—A single WHEELABRATOR invariably does the work of a number of machines; and every replacement means important savings in equipment, piping, maintenance, etc.



AMERICAN

FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST., MISHAWAKA, IND.

DO YOU KNOW THAT —

A large Eastern manufacturer of electrical equipment, using a No. 2 WHEELABRATOR Tumbler, having eight 24" dia. tables, cleaned 400,000 meter cases, parts, magnets, etc., last year at a 75% saving over the previous cleaning method.

★

Since 1934 over twenty-one million centrifugally cast brake drums have been cleaned in WHEELABRATOR Special Cabinets at Centrifugal Fusing Co., Lansing, Michigan.

★

When the Defiance Machine Works, Inc., Defiance, Ohio, installed their WHEELABRATOR Tumbler they eliminated four tumbling mills, reduced Sandblast room time by 60% and increased their production capacity with 1/3 of former floor space.

★

When the 20" x 27" WHEELABRATOR Tumbler was installed at Cushman Chuck Co., Hartford, Conn., for cleaning scale from heat treated lathe-chuck parts the machine cleaned the same amount of work in the first three hours of its operation that previously required three days to handle in their old air blast cabinet.

★

This Industrial Week . . .

• • •

HOW U. S. plants can produce airplanes during 1942 at an average rate of 5000 a month and at the same time carry out the far-reaching model change dictated by war-winning strategy is a thought-provoking subject. Report from various points show that such a thing is being done.

Model changeovers in tanks—for example the switch from the M-3 to the M-4—and in other war implements are likewise being undertaken with considerable success without the uproar and confusion that might be expected. Even a war production machine like that being built in the U. S. reaches some degree of stabilization in production and in its adaptability to new problems. In the automobile industry, tank and plane changeovers are already being compared to automotive changeovers before the war.

Production Ahead Of Schedule

This week, industry was told by Donald M. Nelson that the volume of war material being produced in this country has passed British output three months ahead of the date originally set by production planners of the United States. Many conspicuous examples of how great ingenuity can speed up munitions production are being reported in the converted automobile industry and in other divisions of the war production machine.

Some of the developments in the steel industry, notably new types of gun barrels and new methods of making shells, "too hot" for publication at this time, are not being talked of by industry itself except in a whisper. More and more, the steel industry is putting on the pressure to assist the war effort on the technical side.

Already some well-posted industrialists are said to believe that emphasis on the winning of the production battle in American plant does not hide the fact that the war is, in many ways, going badly for the democracies. However, important, mass production of war goods is only one step toward winning the war. The second stage requires the winning of what has been called the "battle of distribution." Into this stage, the United Nations' war effort is now passing. The last and final step will, of course, be the successful and decisive use of war implements on land, sea, and air battlefields.

Lend-Lease Needs Greater Than Ever

Adaptability of industry to changing demands of war was being tested again this week by the tremendous increase in Lend-Lease steel requirements and shipments. Lend-Lease production of steel over the next 60 days is expected to attain a level far above that reached at any other time since war was declared.

Inevitably, this call for steel exports is strongly affecting the domestic picture. Mill schedules have had to be quickly changed. A shortage of metal is threatening most non-integrated steel makers, and certain allocated and A-1-a business on integrated mill order books is being pushed aside to make room for Lend-Lease production. Within the next month or so some non-integrated steel mills may either shut down or run less than 50 per cent. Certain departments in the large integrated mills may face the same situation. For

another week, the steel supply outlook has darkened for less urgent war needs and for essential civilian war needs.

In the battle of distribution, skirmishes of no small importance are being won. For example—one of the major reasons for the speedier freight handling throughout the country is the balancing of car and trainloads of materials at "hold points" into unit requirements for the armed forces. With the lessons of the First World War in mind, accumulation of loaded cars in harbor areas may be prevented. Some industrial observers believe that those directing war material shipments within the U. S. are at least on the way to setting a bright record.

Coming with the tight situation on semi-finished steels is the returning threat of a scrap shortage. THE IRON AGE is told that efforts of steel mills to accumulate backlogs of scrap have been unsuccessful so far. Collections and loadings have fallen off recently, the loading decline being ascribed to strict or even "over" adherence to OPA regulations; cleaning up of many automobile graveyards to which cars are not coming in at the expected rates; and completion of many local scrap drives which bring in "non-recurring" material.

Obviously the importance of maintaining a substantial scrap flow is vital, since demands upon the steel industry over the next six months are expected to be unprecedented. Many highly rated domestic steel requirements have been pushed back in an effort to meet the Lend-Lease demands for June and the following three months. For

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)

	Pitts- burgh	Chi- cago	Youngs- town	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	South	De- troit	S. Ohio River	West	St. Louis	East	Aggre- gate
Week of June 18 . .	100.0	103.5	99.0	92.0	98.5	104.5	83.0	94.0	107.0	112.0	102.0	108.0	110.0	100.0
Week of June 11 . .	99.0	104.0	99.0	90.0	97.5	104.5	83.0	98.0	105.0	105.0	102.0	108.0	115.0	99.0

this reason the Government is expected to do everything in its power to maintain a flow of scrap to the nation's mills and at the same time expedite the completion of some major blast furnace projects. Among the first of such stacks to be finished will be those units which were originally planned to make up for a deficiency of scrap. Some of these furnaces may be pushed into operation early in 1943, or before, unless the scrap situation improves.

Tin Scrap Will Be Accumulated

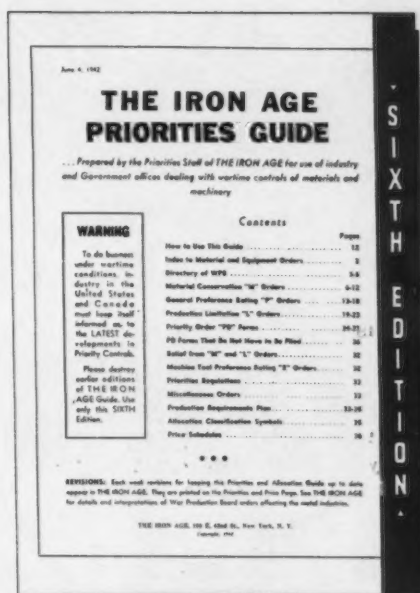
Tin can scrap throughout the country will have to be accumulated to await large scale detinning operations after Government plans are completed, since existing plants cannot take care of the results of local drives. There seems to be little chance that tin can scrap will be utilized in the openhearth furnaces owing to bad effects of tin in heats of steel where such scrap is used. Openhearth operators are more determined than ever to keep tin can scrap out of their furnaces.

Steel plant operations, according to reports to THE IRON AGE from all producing centers, have risen a point to 100 per cent, equalling the record-breaking mark of the week of April 28. Last week's rate was 99 per cent.

Repairs Main Reason For Areas Reporting Down

While adjustments of steel making schedules in the Chicago and Birmingham areas have been made to permit much needed repairs, the falling off in operations at those points is insufficient to offset higher operations in other districts. Steel centers reporting higher operations this week are: Pittsburgh, a point to 100 per cent; Philadelphia, two points to 92 per cent; Detroit, two points to 107 per cent; and Southern Ohio River, seven points to 112 per cent. Lower production was reported at Chicago, down a half point to 103.5 per cent, but with some idle furnaces expected to resume melting during the week; Cleveland, a point to 96.5 per cent; and the Eastern area, five points to 110 per cent.

Youngstown plants report operations holding at 99 per cent, with



ABOUT PRIORITIES: This is the cover (greatly reduced) of the new Iron Age Priorities Guide, Sixth Edition, which includes information for the use of industry and government offices dealing with wartime controls on materials and machinery.

One copy of this guide, which may be kept up to date with revisions appearing weekly in The Iron Age, has already gone to each Iron Age subscriber. Additional copies, each containing the Allocation Classification symbols and instructions on how to operate under the new Production Requirements Plan, may be obtained by wiring or writing The Iron Age, 100 East 42nd Street, New York. Prices of this new, enlarged guide are: One to 10 copies, 50c. each; 11 to 100 copies, 40c. each; 101 to 300 copies, 35c. each; and 300 or more copies, 30c. each. (Cash or stamps, please, for orders of \$2 or less.)

other areas also unchanged as follows: Buffalo, 104.5 per cent; Wheeling, 83 per cent; Western, 102 per cent; and St. Louis, 108 per cent.

By-product and beehive coke supplies seem recently to balance demand. Some new by-product coke plants which have gone into operation recently have produced a greater tonnage of material than was required. As a result, surpluses of by-product coke have been made available to blast furnace operations, one such by-product plant furnishing 60,000 tons for the district in which it is located. At this time the coke outlook for fuel and pig iron is not discouraging.

When electrolytic tin plate production begins soon on a large scale, hot-dipped tin plate output may be cut drastically to conserve tin.

Warehouses Hit Hard by Allocations

The metal-working industry noted this week that the plight of the steel warehouse in some areas is steadily growing worse. Allocations received recently by mills have been limited largely to West Coast jobbers, while warehouses at some points, as Chicago, remained badly unbalanced. Distributors have taken to handling all types of odds and ends to keep their personnel together. Apparently the status of the warehouse in the war effort calls for further government clarification.

Construction of the 550-mile oil-carrying pipe-line from Longview, Tex., to Salem, Ill., will require about 125,000 tons of steel and will cost from \$35 to \$40 million. Deliveries of the tubing are to begin next month and are to be completed in October, with shipment quotas of 140 miles for July, 170 miles in August, 130 miles in September, and 110 miles in October.

The new line, first leg of the 1580-mile Texas to East Coast pipe line, will deliver 300,000 barrels of East Texas crude oil each day into southern Illinois for transshipment to the East Coast shortage area. The line will be a common carrier. The proposed second leg of the new line, requiring 375,000 tons of steel, is to be studied by a special committee appointed by WPB Chairman Nelson.

Metals Reserve Buys 15 to 35% Manganese Ores

Washington

• • • The Metals Reserve Co., RFC subsidiary, this week began the purchase of manganese milling ores of 15 to 35 per cent manganese content at sites where concentration mills are either now in operation or have been recommended by WPB. Purchase stations have been established at Batesville, Ark.; Elizabethton, Tenn.; Butte and Phillipsburg, Mont., and Deming, N. M.



O E M Photo by Palmer, in an Allegheny Ludlum plant



STEEL IS FLOWING TODAY THAT WILL BE FLYING NEXT MONTH

Alloy steel, conceived in the mighty heat of electric furnace arcs, is just being born when it teems into ingot molds.

How soon can the raw steel in those ingots be brought to maturity as parts in finished warplanes (or tanks, guns, ships, munitions)? How much of it can be actually put to work, with only a bare minimum of scrap, "reject" and spoilage losses? In this war, a battle easily may hang on the way any one plant handles its problems of production and conservation.

The Allegheny Ludlum line-up of alloy war-steels includes stainless and heat resistant, tool, valve, nitriding and electrical steels. Information on their more effective fabrication and use includes certified "Blue Sheets" for engineers and technical men; "Handbook of Special Steels" for production men; "Elementary Discussions" of tool and stainless steels for training course use, etc.

Tell us your alloy steel problems—particularly if yours is a converted plant, making unfamiliar products from strange materials. If we don't

have the answers in printed form, the services of our Technical and Field Staffs are also at your disposal.



Allegheny Ludlum
STEEL CORPORATION

GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

News of Industry

• • •

Irvin Works Tops Plate Record by 41,000 Net Tons

Pittsburgh

••• An "extra dividend" of enough steel plate to build 12 large cargo ships was one of Carnegie-Illinois Steel Corp.'s May contributions to America's rolling offensive in the war of production. The U. S. Steel subsidiary last month produced 329,069 tons of steel plates for ships and other urgent war needs, a new record and greater by 41,000 tons than the same company's previous high mark established in March. In shattering its two-month old record, Carnegie-Illinois produced enough extra plates for a dozen vessels.

To attain increased plate capacity the company converted its most modern plant from production of light steels to the more urgently required plates. The facilities of Irvin Works, completed very recently, and originally intended to produce light-gauge material, were extensively rebuilt and enlarged in only 37 days. It is estimated that if the finishing facilities had been purchased as new equipment, completion of the job would have taken from 8 to 12 months.

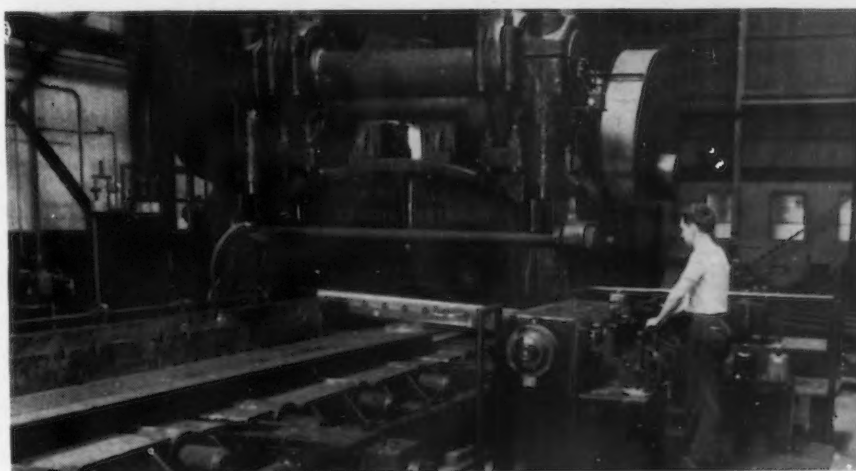
The giant 80-inch hot strip mill at Irvin was converted to handle plates as big as one inch in thickness and 72 ins. wide. Losing no time, the converted Irvin Mill in May produced 38,000 tons of plates, is scheduled to increase its tempo to 47,000 tons this month, and before July will be geared to a schedule of 55,000 to 60,000 tons. In converting the finishing end of the continuous



RECORD BREAKERS: Foreman of the shear crew at Carnegie-Illinois Steel Corp.'s Irvin works, O. E. Elder, shown with William Stein, a member of the crew, pointing with pride at the production record on the new shear line. The record was 636.5 tons in an eight-hour shift.



PLATE HANDLING: This magnetic depiler above, at the Irvin works of Carnegie-Illinois is transferring plate to the roller-leveler. Below, this plate shear on the new production line at the Irvin works of Carnegie-Illinois Steel Corp., was completely reconditioned and put into service recently.



hot reduction line at Irvin Works, "bits and pieces" from numerous plants were brought together, rebuilt and installed by the company's own force, enabling the work to be speeded up considerably. In one case, a steam-driven shear, of nineteenth century vintage, was coupled with an old

roller-leveler, and both units reconditioned into a modern electric-driven finishing line on which a single crew now holds the record of 636.5 tons of finished plates in one 8 hr. turn. This record was accomplished by a crew recruited from other departments of the plant, now inactive, having about

four weeks training on the new plate finishing unit.

New finishing facilities installed to bring about conversion of Irvin Works to important plate production include a piler at the hot strip mill proper as well as at the shearing line. Plates are piled in stacks after rolling and then are placed on cooling beds until the temperature has dropped sufficiently to allow final processing.

The shearing line consists of a cross transfer to convey stacks of plates from the adjacent building where they have been cooled, a magnetic depiler to lift and place the plates on the sheer line, a leveler, entry table, roller leveler to flatten the plates, intermediate tables, shear to cut plate to proper length, discharge table and piler to stack finished product.

Plate production at Irvin Works is now accounting for about 60 per cent of the continuous hot strip mill's output, the balance at present being confined to black plate and tin plate, produced under high priority and allocation orders. There are no sheets being produced at the plant, but

despite this shutdown, employment at Irvin Works remains at the same level which obtained when this large department was in full operation.

National Tube Sets Record For Shell Forging Output

Pittsburgh

••• A new record for production of shell forgings in the Pittsburgh district by the National Tube Co., U. S. Steel Corp. subsidiary, was made recently when, during a 24-hr. period, 5805 pieces passed through rigorous inspection without a single rejection, according to Col. James L. Guion, deputy executive officer, Pittsburgh Ordnance district.

This record, it was said, breaks all previous highs in shell production for the Army. After establishing a new 24-hr. record, the men on this forging unit continued their record breaking performance until a total of 7014 shell forgings had passed through inspection before rejection was encountered, according to Col. Guion.

ARMCO Breaks Production Records for 3rd Month in Row

Washington

••• American Rolling Mill Co.'s plant at Hamilton, Ohio, has broken production records for the third successive month with an output in May of 41,099 gross tons, it was announced recently by C. R. Hook, president of the company.

A labor-management committee was formed at Hamilton in March. The committee launched a campaign with such success that in the first month the plant broke the all-time American Rolling Mill record with a tonnage of 38,141 tons. In April tonnage was upped to 38,785.

A company record shipment from the open hearth department of the Middletown division of 70,985 net tons was also set in May.

In addition to this record, the fabricating division of the American Rolling Mill Co. reported record setting shipments during the month of May. New peaks were reached in three different phases of the division's operations.

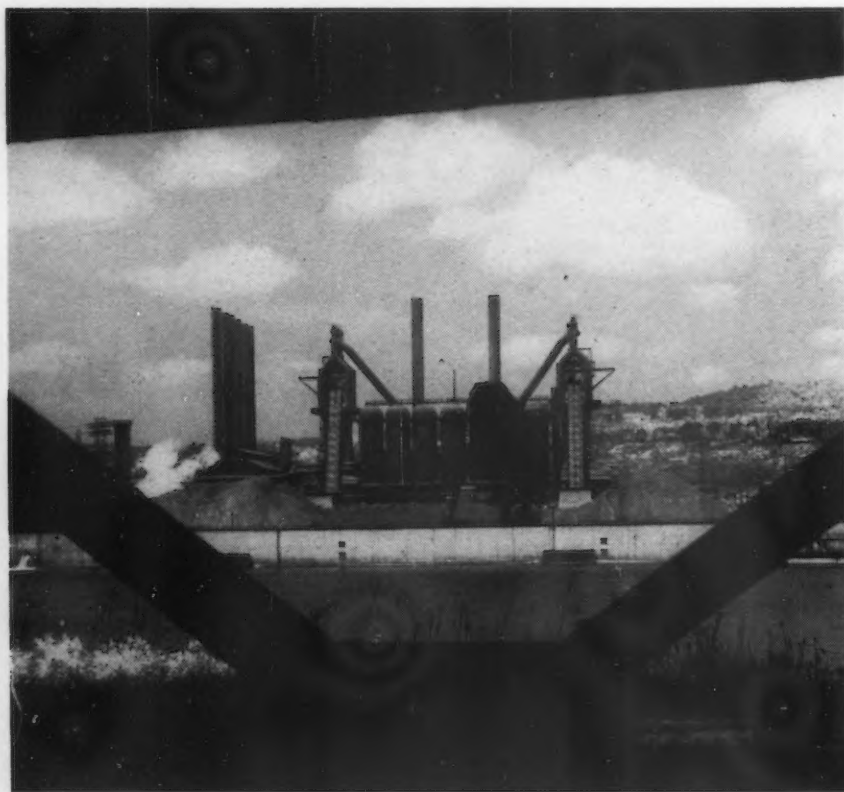
Weld Inspection Covered By Recommended Practice

••• The American Welding Society has recently published a committee report entitled "Recommended Practices for Inspection of Fusion Welding." This report represents a comprehensive treatment of the many factors involved in the inspection of welds made by the arc and oxy-acetylene processes.

The subjects covered include: qualifications of welding inspectors; duties of inspectors; inspection and testing of welded structures; inspection during construction; shop and field inspections; examination of welds; radiographic inspection, hydrostatic testing and magnetic power inspection. A considerable part of the report deals with the welding characteristics of both ferrous and non-ferrous metals and describes the principal types of defects that may be encountered.

This report is available from the American Welding Society, 33 West 39th Street, New York, at 40c per copy.

"V" FOR CARRIE: This photograph shows the Carrie blast furnaces of Carnegie-Illinois Steel Corp., Pittsburgh district, framed by "V" girders to characterize the "Production for Victory" theme of these record-breaking stacks.



Pig Iron Allocation Requests For July Show Slight Decline

Cleveland

••• Requests for July pig iron allocations showed a moderate decline, according to merchant iron producers. The drop is attributed to the steady decrease in the total number of foundries operating as units unable to obtain war business drop by the wayside, and, to some extent, to the somewhat better situation in scrap of many foundries. The better supply of cast grades of scrap is believed to be resulting in a greater use of scrap in relationship to iron at some foundries.

Total July pig iron orders continue in excess of potential output, but it is reported that allocations probably will continue on the basis of trying to give all rated customers a portion of their requirements to permit their continued operation. The various breakdown in blast furnaces during May and the idleness of some units for repairs in June may result in some carryover of unfilled allocations for this month. It is likely that some of this unfilled tonnage will have to be redistributed to producers in other areas, since some merchant iron producing districts may fall substantially short of their allocation quotas due to furnace interruptions.

Revision Announced in Steel Reinforcing Bar Standards

••• The Division of Simplified Practice, National Bureau of Standards, announces a revision of the simplified list of cross-sectional areas for steel reinforcing bars, effective from June 15, 1942. Until the printed issue is available, free mimeographed copies of this revised Simplified Practice Recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

Missouri Pacific Authorized To Buy 4 Diesel Electrics

St. Louis

••• The Missouri Pacific Railroad has been authorized by the Federal Court here to purchase four 5400-hp. Diesel electric freight locomotives to cost \$1,920,000.



KEEPS THEM SAILING: Manganese bronze propeller cast by the Cramp Foundries division of the Baldwin Locomotive Works. Castings of this type, are made in cement molds and finished to a pitch accuracy of $\frac{1}{2}$ of 1 per cent. Single castings of this type weigh as much as 20 tons.

Costs Take 93.5c of Steel Dollar in 1942

••• Operating costs absorbed 93.5c. of the steel industry's sales dollar last year, 2.5c. more than in 1940, and 10.5c. more than in 1929, according to an analysis by the American Iron and Steel Institute of data reported by a group of representative steel companies. After providing for payrolls, taxes, raw materials, depreciation and depletion and all other costs of production, 6.5c. remained of each sales dollar received in 1941. Of that remainder, 3c. were paid out in dividends to stockholders, one-half a cent was paid out as interest to bond holders, while the remaining 3c. were added to the companies' surplus as a reserve for future needs.

In 1940, costs of operation consumed 91c. of each sales dollar. Dividends represented 4c., one cent was accounted for by interest, while 4c. were left in the business as an addition to surplus. In 1929, a total of 17c. was available for interest, dividends and addition to surplus, after meeting operating expenses. The rise in operating costs evident during 1941 continued in the first quar-

ter of 1942, with taxes and payrolls showing the largest gains.

The largest percentage increase in costs last year was in taxes, which accounted for 11.5c. of each sales dollar in 1941, as compared with 6.5c. in 1940 and 4c. in 1929. Although steel payrolls rose to a new record total in 1941, the increase in percentage was less than the percentage rise in tax payments and in total sales. Steel industry payrolls last year accounted for 33c. of each sales dollar received, compared with 35c. in 1940.

Carboloy Co. Subcontracts Tool Production to Illinois Firms

••• Carboloy Co., Inc., Detroit, has announced a further increase in manufacturing facilities for standard tools. Intended to increase reserve capacity for standard tool production, the tool department of another General Electric subsidiary in the Illinois region, formerly manufacturing appliances, has been equipped to produce such tools from carbide materials. These materials will be furnished by and under subcontract from Carboloy, the Detroit tool subsidiary of General Electric.

600 More Patents Seized, Mostly Owned By Germans

••• An additional 600 enemy-owned patents were taken over June 10 by Leo T. Crowley, alien property custodian. With the exception of five patents of Hungarian origin, all were formerly the property of German corporations.

The patents seized included: More than 200 owned by Telefunken, relating primarily to radio and television equipment; another group owned by Siemens covering aircraft instruments; recent patents issued to Zeiss-Ikon relating to cameras and optical equipment; patents of Dornier Werke on aircraft, including flying boats; chemical patents of Deutsche Gold and Silber Scheideanstalt and Deutsche Hydrierwerke; and miscellaneous patents in the fields of textile machinery and automobile construction.

The Office of the Alien Property Custodian now has stepped up to about 1,000 its weekly rate of patents taken over from enemy owners.

••• Crowley on June 9 vested in the name of the United States all right, title, and interest, including accumulated royalties, of G. Wolff Jr. Kom, Ges. in a contract between that German company and the Koppers Co. The contract licenses Koppers Company to install self-sealing doors for coke ovens that are manufactured un-

der patents granted the German concern. The license agreement provided for payment to the German firm of \$60 for each pair of oven doors installed. Royalties accumulated under the contract since remittances to Wolff were stopped in 1940 total about \$50,000.

Workers May Be Assigned Jobs Closer to Homes

Pittsburgh

••• Out of a major transportation study now being conducted in this area by the government, may come a definite plan for shifting steel workers to plants closer to their homes. The men would exchange jobs with other workmen, who would also be moved closer to their respective homes.

Such a plan is by no means in final form but considerable thought is being expended on it in order to conserve rubber on private cars as well as reduce the load of the district's transportation facilities.

While industrial management would obviously offer no objections to such a plan, such factors as seniority, rates of pay, etc., would probably have to be handled in such a way as to satisfy the employee before the plan could become a success. There would be no disposition of any kind, it is said, for management or government to arbitrarily invoke such a plan.

44 Papers Chosen For Oct. Meeting of Welding Society

••• Four months prior to the annual meeting of the American Welding Society in Cleveland Oct. 12 to 16, acceptances to requests for presentation of papers have been received from 44 individuals. This year's meeting is devoted to how welding can assist in winning the war.

Technical papers on war-important welding subjects include the following: "Training of Welding Foremen" by F. H. Achard, supervisor of training, Consolidated Edison Co. of New York, Inc.; "Instruction Methods in Welding Developed by U. S. Office of Education" by H. K. Hogan, U. S. Office of Education; "Welding of Airplane Propeller Blades" by C. A. Liedholm, Curtiss-Wright Corp.; "Welding of New Types of Alloy Steels in Aircraft Structures" by A. R. Lytle, Union Carbide and Carbon Research Laboratories; "Effect of Current on the Welding of X4130 Aircraft Tubing" by W. T. Tiffin, University of Oklahoma; "Spot Welding in Aircraft Structures" by E. S. Jenkins, Curtiss-Wright Corp.; "Results of Survey on Current Arc Welding Practice in Aircraft Industry" by Maurice Nelles, chairman, Western Aircraft Welding Committee; "Electric Welding of Mobile Artillery Gun Carriages" by G. E. Campbell, Pettibone-Mulliken Corp.; "Suggested Methods Which Will Increase Welding Production and Decrease Welding Costs" by J. F. Lincoln, Lincoln Electric Co.; "Distortion and Shrinkage Problems in Ships and Other Large Structures" by LaMotte Grover, Air Reduction Co.; "Motor Boat Construction and Small Ships" by W. E. Whitehouse, Defoe Shipbuilding Co.; "Application of Welding in Submarine Construction" by E. H. Ewertz, Electric Boat Co. and R. D. West, Manitowoc Shipbuilding Co.

McKee Co. Reports Gain In Oil Refinery Work

Cleveland

••• Arthur G. McKee & Co. reports that its contract work has increased further during the second quarter of 1942, with the principal gain being scored in oil refinery construction. Additional orders for special equipment in the iron and steel industry have been received in large volume. As of June 7, unaudited cash and receivables totaled \$3,047,500, and of this cash represented \$1,564,000. The company declared a 75c a share dividend, payable to the Class B stock on June 20, 1942.

Ban Placed On Information About Buffalo Port Arrivals

Buffalo

••• Under orders from the War Department, this city's port list of arrivals and departures of steel, scrap, grain and other cargoes no longer is available for publication.



PRODUCTION SOLDIERS: These Dymanowski brothers, employed at the Carnegie-Illinois Gary Works are three good reasons why the plant could break all-time production records last month. Walter, left, a mill guide setter; John, center, also a mill guide setter; and William, right, a millwright, are out to avenge the death of a fourth brother, killed in the Java Sea battle.



FARREL DRIVES for VICTORY UNDER the NAVY "E"



The Navy "E" lapel
emblem awarded to all
Farrel-Birmingham
employees

In recognition of *Excellence* in the production of Farrel Gear Drives for Navy ships, our three plants at Ansonia and Derby, Conn., and Buffalo, N. Y., have been awarded the "E," traditional Navy symbol for a job "Well Done."

In all our plants resourceful engineering, skilled workmanship and modern facilities are being combined in a sustained drive not only to meet but continuously to exceed the Navy's expectations in production performance, so that we may more than merit this distinctive honor and keep the "E" burgee flying over our plants.

Every member of our organization is proud of the honor conferred upon him and all dedicate their individual and cooperative effort to the utmost production of war equipment needed for America's Victory Drive.

When victory is won this same combination of plant and personnel will again be able to devote its facilities and skill to building equipment for the advancement and improvement of manufacturing processes for American peacetime industry.



FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN., BUFFALO, N. Y.

Plants: Ansonia and Derby, Conn.; Buffalo, N. Y.



FIRST RUN PICTURE: Newly hired employees of Allis-Chalmers Mfg. Co. received instructions in safety practice by means of motion pictures, before going to work. They are paid for this learning time.

Allis-Chalmers Plan Orients New Employees

Milwaukee

••• Faced with the task of hiring 6000 new employees to man its new war plant, Allis-Chalmers Mfg. Co. has developed a unique procedure for introducing new employees, many of whom have never before been inside of an industrial plant, to the company, its policies, its products, and the conditions under which they will work.

A large proportion of these new workers, who are being hired at the rate of 150 to 200 a day, are being drawn from non-industrial sources and are unaware of such matters as safety procedures, identification badges, workmen's compensation, clock card systems, etc. This introduction procedure is under the direction of R. G. Greiner, supervisor of training.

The meetings, which last 3 hours, are held in the company's industrial relations lecture room, with the new employees being paid full wages for the time spent in the meeting. A discussion of the history and progress of the company and the products it manufactures is followed by a discussion of the work to be performed by the new employees. Regulations are clearly explained. The necessity of having identification badges is also explained, and the dangers arising from their misuse pointed out.

Company policies are then discussed, followed by a general ex-

planation of group insurance, workmen's compensation laws, the Mutual Aid Society (which provides hospitalization and other benefits) and the Industrial Relations department. A talk on safety is supplemented by a booklet entitled "Safety Always." Use of goggles and safety shoes, how to seek first aid, what to do in case of fire, etc., are discussed.

This is followed by a film, "A Safe Day," which dramatizes the precautions needed at home, while driving to work and while at work, to avoid accidents. Another film, "Factory Safety," points out plant hazards and how they may be avoided. Safety in the home is included because the company feels that an accident at home can do as much damage to a worker's productive capacity as one in the plant. The plant management also feels that safe working must become second nature to an employee and to cultivate this it is necessary to begin at home. Also shown is a film, "We Work for War and We Plan for Peace," produced in the company's plants to illustrate the role the company (and the new employees) are playing in the war effort.

The new employees are given an opportunity to ask questions about anything bothering them. Pains are taken to answer all questions in detail, and to impress the workers with the fact that the management is interested in the welfare of each employee. The new employee is then given the best wishes of the management for success on his new job and

directed to his new place of employment.

The success of this plan is typified by the remarks of a new woman employee during the question period at one session. This worker said she had no questions to ask, but wanted to let the company know that when she first entered the plant she was terribly frightened by its size and activity, but after attending the meeting and having the work and aims of the company explained, she felt very much at ease and was eager to do her share.

Steel Industry Relaxes On Job Qualifications

Pittsburgh

••• Need for war work manpower has already reached the stage where men in advanced years and even some possessing minor physical deformities are being given employment in increasing numbers where their qualifications otherwise fit the job under consideration.

Many steel workers' jobs recently have become dislocated because of priority reasons when some finishing mills were shut down because of lack of steel. Industrial relations departments are interviewing the dislocated employees in an effort to place them.

In some cases, furloughed steel workers affected by priority operations have drifted into other war work.

Steel officials continue to show anxiety over the labor supply which is constantly affected by the draft, more lucrative war jobs, etc., but interviewing has continued at an unprecedented level and much training is taking place.

Four New Schools for Air Force Authorized

••• The War Department announced June 9 authorization for the construction of the following air force training schools:

One at Pecos, Texas, to cost in excess of \$3,000,000. Construction will be supervised by the Albuquerque district office of the Corps of Engineers.

Another at Winslow, Ariz., to cost in excess of \$3,000,000. Construction will be supervised by the Los Angeles district office of the Corps of Engineers.

A third at Douglas, Ariz., to cost in excess of \$3,000,000. Construction will be supervised by the Albuquerque district office of the Corps of Engineers.

Another at Arkansas City-Winfield, Kan., to cost in excess of \$3,000,000. Construction will be supervised by the Tulsa district office of the Corps of Engineers.



Metal facts...Organized for Production Victories

American industry...in the rush of converting its plants to war production...needs much new information about alloys. Such information...detailing the selection, fabrication and uses of ferrous and non-ferrous Nickel alloys...is available promptly from our files of technical reports and shop guides.

And, as further support in the battle of production, we offer the assistance of our

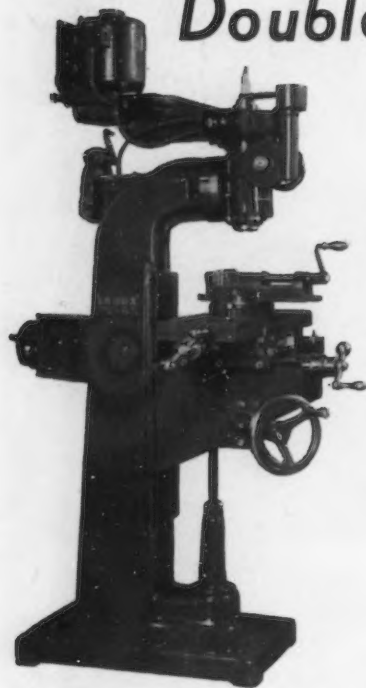
engineering staff and field service men. Their recent experiences in many plants, their practical knowledge of ways to overcome shortages of materials, makes them especially helpful during wartime.

Nickel...and information about Nickel...goes wherever they best speed Victory.

Nickel

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N. Y.

A Vertical Miller that Doubles in Jig Boring!



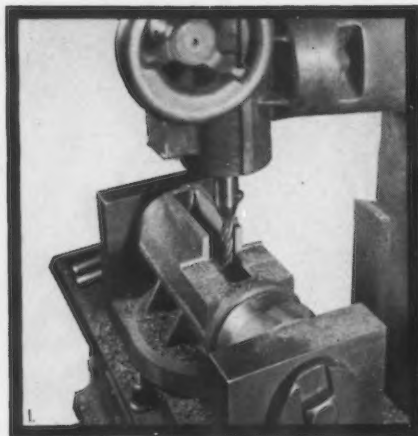
THERE'S almost no limit to what an end mill will do when it is driven by a superior spindle such as is standard equipment on every 40-H Index Mill. Spindles that run in super precision preloaded ball bearings lubricated at the factory for ordinary service indefinitely.

As a vertical miller it's a wonder, but hundreds of users say they use the machines largely for jig boring. The machine has slow spindle speeds for boring (besides the fast speeds for end milling), power feed to spindle, verniers for locating and precision construction everywhere so that the verniers will really mean what they say. An unusual machine at an unusually low price.

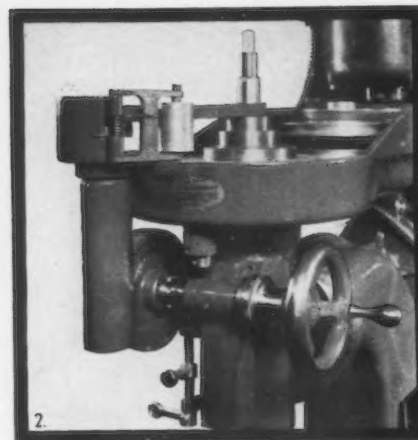
BLANK & BUXTON MACHINERY CO.
3100 EAST MICHIGAN AVENUE — JACKSON, MICHIGAN

40-H INDEX

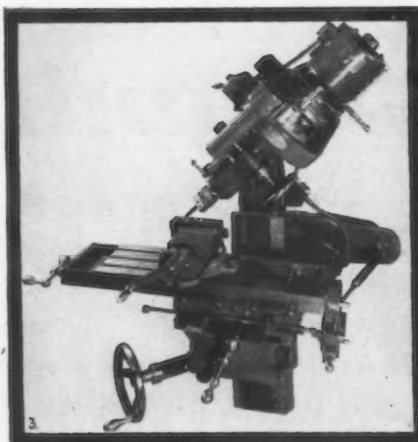
*A Tried and Proven Machine for Milling, Drilling and Boring
in the Tool, Die, Experimental and Production Shops*



Precision end-milling



Power drive to spindle quill



Head swivels 90° each way

PRP Embodied in New Regulation

Washington

• • • A material flow pattern to war time industries, the first overall effort to coordinate control of the distribution and use of scarce materials, has been worked out by WPB and embodied in a new Priorities Regulation No. 11. Definite quantitative limits to the acquisition of metals and other scarce materials by any person or company using more than \$5000 worth of metal in a calendar quarter has been established. Government arsenals, shipyards, ordnance plants, and other agencies, as well as manufacturers of munitions, airplanes, and other large users of metal are subject to the requirements of the new regulation.

Creation of a Combined Production and Resources Board by the President to coordinate the distribution of materials and production programs required the direction of every pound of material into the war program and absolutely essential civilian uses. Production of non-essential civilian goods has been virtually stopped for the duration, and it has become necessary to exercise careful control over the distribution of materials among military and vital civilian demands.

The maximum quantities of scarce materials which may be acquired by each individual company qualifying under the Production Requirements Plan in each three month period beginning July 1 will be determined by the

Part III of the "Specific Instructions" for manufacturers operating under the Allocation Classification System appears on Page 120.

Requirements Committee of WPB. The basic instrument used in this quarterly apportionment of materials to individual companies is the PRP, but PRP will no longer be primarily a mechanism for assignment of preference ratings to each applicant on the basis of rated orders the applicant has on his books. PRP now becomes the chief means by which WPB will execute general policies. The em-

Guard Badge with Life, Workers Warned

Milwaukee

• • • "Guard your identification badge with your life," Allis-Chalmers Mfg. Co. tells each new worker: "It is your badge of service in the war effort." An employee's badge is of no service to anyone except those endeavoring to hinder war production by damaging plant equipment, it is pointed out. A man entering a plant wearing a stolen badge is as dangerous as a spy sneaking into an American trench wearing a stolen American soldier's uniform, each new worker is warned.

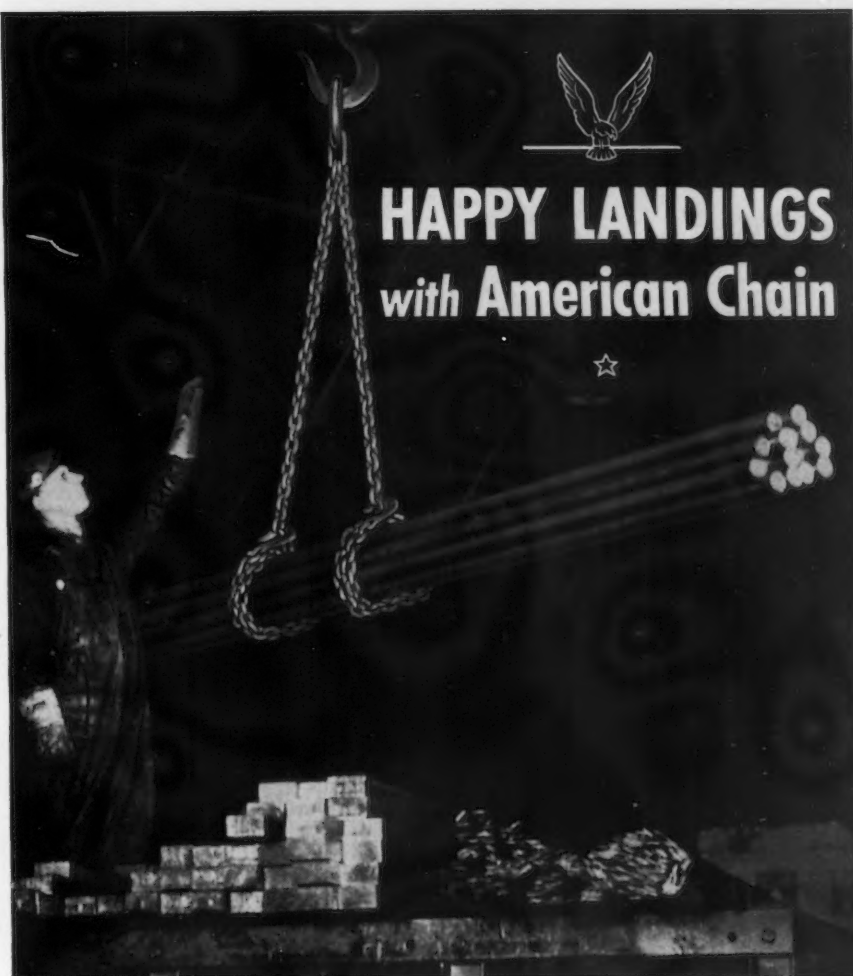
phasis from now on will be on the end use of materials rather than on preference ratings. The Allocation Classification system will be used to obtain information on the end use to assist in controlling the distribution of metals for the fourth quarter of this year.

This program, for the first time, gives WPB centralized control of the distribution of materials.

During the third quarter, the primary emphasis will be on the distribution and use of metals. Only companies which use more than \$5000 worth of basic metal in a quarter will be required to apply under the PRP for the quarter beginning July 1. A few special classes of companies will be controlled by existing procedures for the present. Each large user of metal will be required to obtain a quarterly authorization for all scarce material requirements under PRP. A rating under PRP, however, does not guarantee material delivery covered by the rating. Actual shipments of material will be governed by the month-to-month directions from WPB, on the basis of the appropriate forms required of each material.

For companies using less than \$5000 worth of basic metal in a quarter, a percentage of the total supply of materials will be set aside, and these firms may obtain their minimum requirements from this reserve by use of the regular priorities procedures now in effect.

To prevent leaks in the program, all companies which receive certificates under PRP will be pro-



★ It has been said that what goes up must come down. If it's a heavy load, raise and lower it with AMERICAN CHAIN.

AMERICAN CHAIN, because it provides safety, instills confidence in the men who handle the job.

War necessities have brought dangerous responsibilities to many new, untrained men. Give them AMERICAN CHAIN to reduce the accident hazard.

And give them instructions in how to use chain safely and economically. We'll be glad to supply suggestions.

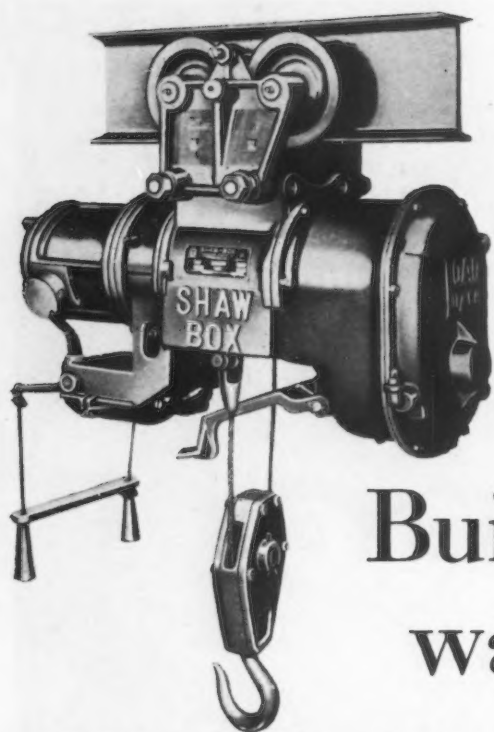
AMERICAN CHAIN DIVISION

York, Pa., Boston, Chicago, Denver, Detroit, Los Angeles,
New York, Philadelphia, Pittsburgh, San Francisco



In Business for Your Safety

AMERICAN CHAIN & CABLE COMPANY, INC.
BRIDGEPORT, CONNECTICUT



Built for war work

A SHAW-BOX 'Load Lifter' electric hoist was designed for tough, grueling work, long working days and indefinite years of hard service. This versatile hoist now takes on the extra burdens of all-out war production. It lifts most at the least cost due to its special features:

1. "One-point" lubrication.
2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.

'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.



'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves. Consolidated Safety and Relief Valves and 'American' industrial instruments.

hibited, after July 1, from using or extending preference ratings assigned in any other manner, except for construction or items of capital equipment. Until a certificate is received by a company, however, they may continue to use other ratings within specified limits, but after July 1 no company using more than \$5000 worth of basic metal in a quarter which has not filed a PRP application may use any form of preference ratings for production materials. In addition, no company using a PRP certificate may accept delivery of materials listed in Materials List No. 1 of the PRP application form, PD-25-a, or other materials for which has been sought priority assistance, in greater quantities than those authorized on the certificate, even if the materials can be obtained without use of a preference rating. Companies operating under PRP which need capital equipment or priority assistance for construction or expansion may apply in the usual manner on PD-1-a or PD-200 and PD-200-a application forms.

Priorities regulation No. 11 affects any company, business, person, plant, or division of a company maintaining a separate inventory whose past or anticipated quarter receipt or withdrawals from inventory of metals, in the forms covered by the Metals List in the regulation, aggregate \$5000 or more, with the following exceptions: United States or other government agencies except those engaged in manufacture, such as shipyards, arsenals, prison factories, etc., which are subject to the requirements; transportation, heat, light, power, electricity, gas, or water companies; mining or quarrying companies; production, refining, transportation, distribution, or marketing companies for petroleum or associated hydrocarbons; communication companies; sewerage and drainage; wholesaling, retailing, and processing of material companies; companies engaged in extracting, smelting, refining, alloying, or processing metal ores or scrap into raw metal; and construction companies. With these exceptions, all companies using more than \$5000 worth of metal quarterly are defined as Class I producers, and are required to file a PRP application not later than June 30.

Brassert Makes License Agreement with S. P. Kinney

Pittsburgh

• • • Effective June 1, H. A. Brassert & Co., consulting engineers, made an exclusive license arrangement with S. P. Kinney, formerly vice-president of that company, which covers the manufacture, sale, and installation of all equipment previously made and distributed by the Brassert organization.

The items covered in the arrangement consist largely of accessory equipment used in blast furnace operation. The main offices of H. A. Brassert & Co. are in New York, where iron and steel plant designing, construction, and consulting engineering business is conducted.

Ore Shipments Hit New High in First Week of June

• • • A new high record for all time in the number of freight cars loaded with iron ore and all other ores was established by the railroads in the week ended on June 6, the Association of American Railroads announced. The total for that week was 92,453 cars. The previous record was established in the week of July 14, 1923, when the number of cars loaded with ore totaled 89,087.

Ore loading for the week of June 6 was an increase of 13,931 cars or 17.7 per cent above the same week in 1941, and an increase of 9567 cars above the week ended on May 30, 1942.

USWA Wins Elections in 23 Carnegie-Illinois Plants

Pittsburgh

• • • Elections in 23 operating units of Carnegie-Illinois Steel Corp. gave the United Steel Workers of America 46,490 votes as an exclusive bargaining agency, while 3720 workers voted "no." Approximately 91 per cent of the votes cast in Carnegie-Illinois elections were in favor of the USWA as an exclusive bargaining agent.

Elections held so far in U. S. Steel Corp. subsidiaries have given the USWA 110,056 votes with 8777 cast against it. Elections held several weeks ago gave substantially the same ratio in favor of the USWA as was the case in the Carnegie-Illinois elections last week.



Faster Driving • Less Effort • Better Work = 50% Less Assembly Cost with Phillips Screws

It seems reasonable to expect more production and better work from a man who doesn't have to sweat and strain (and curse) in order to drive a screw.

Plants which have switched over to Phillips Recessed Head Screws do find that quantity and quality both respond nicely to the change. The Phillips Screw clings to the driver, transmits driving power more efficiently, prevents screw-driver slippage, drives straight automatically and doesn't chew up when you start to drive it home. On top of that, it is more often practical to use electric or pneumatic drivers.

With so many nuisances and strength-wasters eliminated, operators do better work, even in awkward positions or even if inexperienced. Where accuracy is important, it is easier for them to line the job up right — seat the screws securely — and avoid costly rejects.

So keep your men cool as cucumbers with Phillips. Meanwhile, you'll be pleased as Punch to find that assembly costs are cut in half as a result of Phillips Screws.

Any of the Phillips Recessed Head Screw manufacturers listed below can furnish screws and facts.



PHILLIPS RECESSED HEAD SCREWS
GIVE YOU 2 for 1 (SPEED AT LOWER COST)

WOOD SCREWS • MACHINE SCREWS • SHEET METAL SCREWS • STOVE BOLTS • SPECIAL THREAD-CUTTING SCREWS
• SCREWS WITH LOCK WASHERS

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio

New England Screw Co., Keene, N.H.
The Charles Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N.Y.
Pawtucket Screw Co., Pawtucket, R.I.
Pheol Manufacturing Co., Chicago, Ill.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N.Y.
Scovill Manufacturing Co., Waterbury, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N.H.

Mechanical Engineers Discuss War Production Problems

Cleveland

• • • Control of quality and particularly of surface finish are two of the main factors in the production of ordnance materiel in the war effort, according to several speakers who participated in the semi-annual meeting of the Amer-

ican Society of Mechanical Engineers held at Cleveland, June 8 to 10. The first attempt to introduce surface finish standards within the ordnance department was described by Miss Mary R. Norton, metallurgist, Watertown Arsenal. The new system which is

built around a number of standard samples of surface quality, will supplement the old finish symbols used on ordnance drawings such as f, ff and fg.

The samples have been finished by slab milling, end milling, grinding and planing or shaping and ranged in surface roughness from 250 micro-in. for a planed surface down to 8 micro-in. for a lapped surface. According to type of work and application, the ordinary drawing room symbols have been broken down into several divisions. For example, the symbol fg may cover a range of 8 to 58 micro-in. whereas the symbol f may cover a range of 45 to 250 micro-in. About 500 sets of sample finishes are being made up and shortly will be distributed to all manufacturing arsenals and to the principal ordnance contractors in the 13 ordnance districts.

Although the method is based on some of the principles stated in the tentative standard B-46 of the American Standards Association, which incidentally has been returned to the committee for revision, it is only a partial answer to the problem of designating surface finishes, since it is obviously impossible to revise all ordnance drawings now in the field. The system of using samples follows closely that used by General Electric during the past 10 years. The GE system as explained by a representative at this meeting, consists in using f values with exponents ranging from one to eight (f⁸, for example), with corresponding specimens finished to 4, 8, 32, 64, 125, 250, 500, 1000 and 2000 micro-in., as read on the profilometer.

Another paper related to surface finish of journals as affecting friction, wearing-in and seizure of bearings. The data, presented by Dr. L. H. Milligan, of the Norton Co., have been developed at the Batelle Memorial Institute and indicated that a fairly close correlation between surface finish and the loads that a bearing can carry before seizure occurs is directly related to the product of profilometer readings taken circumferentially around the journal and parallel to the axis (across the lines of scratches). In the discussion, however, it was brought out that circumferential scratches in the direction of run-in are so

WYANDOTTE MK-50

WILL SAVE YOU TIME AND MONEY

WYANDOTTE MK-50 Solvent Detergent is used principally in medium and high pressure mechanical spray washers. It is non-toxic and has absolutely no effect on any ferrous or non-ferrous metal. It is practically neutral and remains so during its life in solution. A valuable feature is its ability to throw off the absorbed oils, greases, etc.

An important use for Wyandotte MK-50 is degreasing metal parts using water solution in metal parts power-washing machines. *It is being successfully used for degreasing in preference to the scarcer and more costly chlorinated solvents.*

Here's a typical case:

Cleaning large aluminum alloy castings prior to anodizing.

- These castings have such low tolerances that they are checked with master dies after cleaning to insure no loss of metal during the cleaning operation.

Equipment:

Two-compartment mechanical washer.

1st Compartment:

Temperature—145° F.
Concentration—1 gallon Wyandotte MK-50 to 1000 gallons of water.
Time under operation, approximately 1 minute.

2nd Compartment:

Clear hot-water spray rinse, 145° F.

- Wyandotte Service Representatives are skilled in solving cleaning problems of all kinds. They are constantly finding short-cuts and helping to eliminate cleaning bottle-necks. A call for their assistance places you under no obligation.



THE J. B. FORD SALES COMPANY • WYANDOTTE, MICHIGAN



WOMEN BUILD SHIPS: The inevitable heavy influx of women into production to relieve manpower for the armed services has proved highly satisfactory in nearly every instance. Here, Katherine Horne demonstrates her skill at operating a milling machine in the Merchant Marine works of Westinghouse. She is shaping impulse blades for steam turbines on merchant ships.

elongated that the profilometer is insensitive to measuring them.

A novel mathematical analysis of the action of abrasive cut-off wheels was presented by W. B. Heinz of Bound Brook, N. J. His computations were based on the assumption that wheel wear results largely from bending and impact of the wheel against loose chips which accumulate in the kerf toward the end of the cut. Mr. Heinz believes that these chips do not stay neatly confined within the surface voids of the wheel but some of them are rolled and dragged along beneath the wheel points until they can finally escape. On this basis, the longer the average distance through which the loose metal must be dragged before it is thrown out of the cut, the shorter will be the life of the wheel.

Mr. Heinz showed mathematically that the average "drag dis-

tance" can be reduced by keeping the work moving instead of leaving it stationary as in conventional cut-off practice. According to his theory, wheel life could be multiplied many times by rotating the work forward, that is against the direction of wheel rotation, at a relatively low speed. The effect is less pronounced when the work is rotated so that the point in contact with the wheel is traveling in the same relative direction.

In a session devoted to aircraft

production problems, Russell Franks and W. O. Binder of Union Carbide and Carbon Research laboratories, presented physical data on cold rolled stainless steel as used in aircraft. Some of the newer information contained in this paper related to the physical properties of stainless steel containing 17.5 per cent chromium, 4.3 per cent nickel, 5.4 per cent manganese, 0.27 per cent silicon, and 0.12 per cent carbon. By proper cold working, tensile



Dealers
in
Principal Cities

A accuracy is basic...

1. IN AMERICA'S WAR EFFORT —
2. IN ABRASIVE SURFACE GRINDERS

ACCURACY IN THE TOOL ROOM—Accuracy in the tool room is essential to all machine production. Interchangeability of parts, the foundation of mass production, is impossible unless tools and discs are accurately finished. Hundreds of Abrasive No. 1½ Surface Grinders are on active duty in tool rooms of plants in the thick of war production . . . Operators prefer them, first, because they are accurate and then because they are easy to operate and have an unusual capacity, 15" x 10" x 12" high . . . Management likes these hand operated grinders because they are less expensive in first cost, cost of operation, and cost of upkeep. Write for Catalog No. 1½.

ACCURACY IN PARTS PRODUCTION—News reports of the daring raids of U. S. fliers against the Japs in the Philippines state that the planes used were salvaged from parts of many other machines wrecked in service. This is a tribute to American mass production and to the accuracy which made individual parts so completely interchangeable. Abrasive No. 3B machines are in use in the Nation's airplane engine, tank, munitions, and other shops finishing parts the accuracy of which is essential. Write for Catalog No. 3B.

ACCURACY IN MACHINE TOOL BUILDING — Only an accurately built machine can produce accurate work. Illustration shows an Abrasive No. 34 Surface Grinder with circular grinding attachment in our own shop helping to finish parts for Abrasive Grinders. This built-in-accuracy has been responsible for the success of Abrasive Surface Grinders and the real reason why they have been ordered by so many other machine tool builders—both before and during this emergency. Write for Catalog No. 34.

ABRASIVE MACHINE TOOL COMPANY

Dealers in Principal Cities


EAST PROVIDENCE . . . RHODE ISLAND

strengths of over 200,000 lb. can be obtained in this material with elongations ranging from 10 to 19 per cent.

Considerable data on the basic strength characteristics of plastic bonded plywood was given by George B. Parsons of the Dura-mold Aircraft Corp. He indicated that by the proper distribution of cross and longitudinal plies and control of the initial moisture content of the wood it was possible

to produce an engineering material whose overall physical properties could readily be calculated. With this type of laminated structure it is possible to build a wing section from 1 in. thick at the fuselage junction to $\frac{1}{4}$ in. at the wing tip, simply by the proper arrangement of plies. These materials can be molded to compound curvatures with little difficulty.

In a panel discussion on material substitution, Howard Carpen-



**FLATNESS
AND
SMOOTHNESS
of Production Parts**

YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. . . . any metal or material, or any combination thereof . . . much faster, more uniform than hand methods.

Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.

Ultra-Lap MACHINE COMPANY
255 McDOUGALL AVE. DETROIT, MICH.



**KEEP
THEM
BURNING
TO SPEED PRODUCTION**

Return Empties Promptly—
Cylinders Are Your
Gas Supply Line

SEND BACK THE EMPTIES: Production today, using oxygen and acetylene on an unprecedented scale, requires hundreds of thousands of cylinders. Producers, through poster, mail, advertising, and personal appeal campaigns are urging that the cylinders be returned as quickly as emptied so that an adequate supply of the gas can be delivered to users.

ter, Republic Steel Corp., commented on the progress being made in the adoption of the new NE (National Emergency) steels, and predicted that after the war these low alloy steels will have taken the place of the highly alloyed steels of "the good old days," and what are now termed NE steels will have become standard accepted analysis.

Tell Berna, general manager of the National Machine Tool Builders Association, reported that the necessity for substituting new steel alloys was hitting the machine tool industry at a particularly bad time, especially in view of the fact that the industry has a nine-month backlog at present. The machine tool builders have been cut off completely from the use of nickel alloy steels, but as in the case of aluminum, it will probably be doled out to those manufacturers who can prove conclusively that they need what they are asking for. As it is, Mr. Berna stated that the tool builders will now have to test certain parts that will have to be made out of NE steel before shipping them. He expressed concern over the probable experience with NE steels in such parts subject to stress and strain as clutches, spindles and gear. In the example of aluminum, the tool builders reduced aluminum consumption 85 per cent within a period of six weeks.

Harvester Drive Yields 35,000 Carloads of Scrap

Chicago

••• A total of 1,357,000 tons of scrap metal, equal to 35,000 carloads has been collected from farms, villages and towns through the scrap salvage program sponsored by International Harvester Co. and carried out by its 8500 farm equipment dealers, by company branch house employees and numerous local cooperating groups, the company reports. The collection has been in progress three months.

The collection program was handled entirely through scrap dealers and no profits were made by either the Harvester Company or its implement sellers. This drive, one of the most successful efforts to get in the scrap to date, was described by Fowler as an example of how American business can render service to the whole nation during this period of emergency.

T. C. I. Blast Furnace Blown Out for Repairs

Birmingham

••• A blast furnace of the Tennessee Coal, Iron & Railroad Co. has been blown out for repairs. Although no announcement was made by the company it is understood that the stack is scheduled to be blown in 45 days after repairs were started. The remaining 20 blast furnaces in this district continue in production.

Ryerson Heads Safety Campaign in Steel

Chicago

••• Edward L. Ryerson, chairman of Inland Steel Co., has been appointed to direct a national campaign to protect peak war production in the iron and steel industry through reduction of accidents.

As national chairman of the Steel and Iron Division of the War Production Fund to Conserve Manpower, he will organize and lead a drive in this industry to obtain \$400,000 in funds for the projected two-year campaign.

The Chicago headquarters of the National Safety Council, which is cooperating in the all-industry drive, has released figures which indicate that the iron and steel industry's major task will be to

maintain its present low rating for frequency of accidents and to lower its high rating for severity of accidents.

The War Production Fund to Conserve Manpower, an agency created by leading industrialists as part of the National Safety Council expects its safety campaign will check interruptions in war production caused by accidents on and off the job.

Accident losses have decreased

from 25 to 85 per cent in most of the 25,000 industrial plants which have adequate safety programs, but there are indications that the total of man-hours lost this year may be of record proportions unless the importance of accident prevention is brought not only to workers but to their families. Of the 460,000,000 man-days lost last year, 280,000,000 were to workers away from their jobs, the Council reported.

Free

A DURABLE WIRE GAUGE CHART to those in metal working mills to whom it would be useful. Printed in 4 colors, 16" x 22", laminated and mounted on 1/4" fiber board. Absolutely free so long as supply lasts; then no more "for the duration."

THE TORRINGTON MANUFACTURING CO., Torrington, Conn.

CLIP THIS AD AND KEEP THE CHART HANDY FOR DESK REFERENCE

WIRE GAUGES				
WASHBURN & MOEN, AMERICAN STEEL & WIRE CO. & ROEBLING (FOR STEEL WIRE) AMERICAN OR BROWN & SHARPE (FOR NON-FERROUS SHEET AND WIRE)				
7/0 .490	3 .2437 .2294	12 .1055 .0808	21 .0317 .0285	30 .0140 .0100
6/0 .4615 .5800	4 .2253 .2043	13 .0915 .0720	22 .0286 .0253	31 .0132 .0089
5/0 .4305 .5165	5 .207 .1819	14 .080 .0641	23 .0258 .0226	32 .0128 .0080
4/0 .3938 .4600	6 .192 .1620	15 .072 .0571	24 .0230 .0201	33 .0118 .0071
3/0 .3625 .4096	7 .177 .1443	16 .0625 .0508	25 .0204 .0179	34 .0104 .0063
2/0 .331 .3648	8 .162 .1285	17 .054 .0453	26 .0181 .0159	35 .0095 .0056
1/0 .3065 .3249	9 .1483 .1144	18 .0475 .0403	27 .0173 .0142	36 .0090 .0050
1 .283 .2893	10 .135 .1019	19 .0410 .0359	28 .0162 .0126	37 .0085 .0045
2 .2625 .2576	11 .1205 .0907	20 .0348 .0320	29 .0150 .0113	38 .0080 .0040
The TORRINGTON				

Let's All Help in Scrap Campaign

As a part of our contribution to the successful prosecution of the war, we have for the past ten months urged the maximum collection and shipment of iron and steel scrap.

We began this advertising campaign long before Pearl Harbor—long before Government agencies had taken active steps to increase the flow of scrap.

Iron and steel production, though it has not reached maximum capacity, has been continuing at a high rate.

To what extent our efforts have contributed to the greater flow of scrap, we have no means of measuring, but we have tried to do our part.

We welcome the aid of the Waste Paper Industries, whose campaign for paper, eminently successful, has been diverted into a plea for more scrap metals.

THE \$2,000,000 PUBLICITY CAMPAIGN TO BE INAUGURATED BY THE STEEL INDUSTRY ITSELF WILL UNDOUBTEDLY HELP IMMEASURABLY IN MAKING EVERYONE SCRAP CONSCIOUS.

The War Production Board is now encouraging steel mills to build up scrap inventories against next winter's probable letdown in normal flow of scrap. A 10,000,000 ton reserve stock is the goal.

Let's all help in every possible way to make more steel.

The
**CHARLES
DREIFUS**
Company

(Brokers in Iron and Steel Scrap for
40 years)

Philadelphia, Pa. Pittsburgh, Pa.
Widener Bldg. Oliver Bldg.
Rittenhouse 7750 Atlantic 1856

Worcester, Mass.
Park Bldg.
Worcester 6-2535

PRICES

Price Order on Concrete Bars Raises Important Questions

... Within a few days after it was issued last week, the new price order governing fabricated concrete reinforcing bars was famous as the most confusing regulation issued since the establishment of Governmental price control.

Seemingly, the schedule ties in with price schedule 6 governing mill steel prices, but actually it is a specific and separate order covering a field which had never been under regulation. The fact that some leading mills are also fabricators complicated the picture.

A notable feature of the schedule is that it seemingly requires reports to be made on costs.

Major question not answered as yet resulting from the new price ceiling covering fabricated bars, is whether steel mills selling through their own warehouses are to be governed by iron and steel price schedule No. 6 or whether they are governed by the fabricated concrete bar ceiling price. Some sources believe that producers may not charge more than the \$2.15 a 100-lb. base price allowed in the iron and steel price schedule for concrete bars, even though such producers maintain

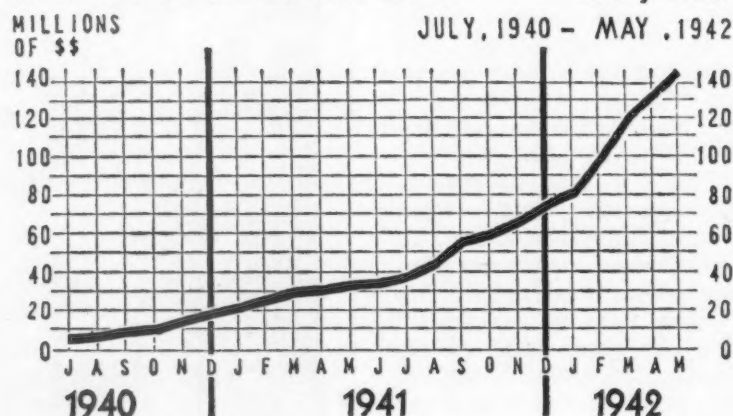
fabricating shops and warehouses. Clarification is expected soon and is being sought.

Concrete bar fabricators, prior to the latest price ceiling for their industry, were not covered by maximum price levels except those applying under the general maximum price regulation. The new price ceiling represents considerable reduction in some cases over some prices charged during the past year or so. Contractors in many instances have paid fabricators concrete bar prices ranging from \$2.40 a 100-lb. base to as high as \$4 a 100-lb. or more. Recently, however, prices from fabricators have approximated \$2.40 a 100-lb. base price and on A-1-a business competition with the mills has been so intense that fabricators wishing this type of orders have in most cases been forced to charge \$2.15 a 100-lb. base, the maximum allowed shipments from the mills to the consumer by price schedule No. 6.

Rough estimates seem to show that in the past several months about one-fourth of the concrete bars have been sold by fabricators at prices ranging from \$2.40 a 100-lb. base price to, in some instances,

WAR SPENDING GAINS: The average daily rate in May rose to \$148,200,000, a gain of 10 per cent over the April rate. This compared with a gain of 12 per cent in April over March, while increases of 21 per cent each were shown in March and February over the preceding month.

U.S. WAR EXPENDITURES — Daily Rate



PRICES

\$4 or more a 100-lb. About one-fourth ranged in price from \$2.15 a 100-lb. to \$2.40 a 100-lb. base, and about 50 per cent went at \$2.15 a 100-lb. base.

According to the understanding of some sellers, concrete bars in either straight lengths or cut lengths sold off producing mills to the site are covered by the maximum price of \$2.15 a 100-lb. as governed by price schedule No. 6, while concrete bars sold from the mill on the fabricators account but shipped from the mill to the site were also believed to be governed by price schedule No. 6.

It is expected that in view of the fabricated concrete bar price ceiling, some changes may be forthcoming soon in price schedule No. 6 as the latter applies to the sale and shipment of concrete bars. The industry practice has been to make a functional deduction of 25c below \$2.15 for bars when purchased in 20-ton lots of a size and in lengths 30 ft. or longer. It is now proposed that this be embodied in schedule No. 6 but it is desired that it be restricted specifically for fabricators. However, OPA contends the deduction has always been a quantity discount.

Highlights of the new price order (No. 159) covering fabricated concrete reinforcing bars, predicted in these pages several times previously, include:

Maximum delivered price of \$2.40 per 100 lb. for most of the United States.

Where bars were purchased by fabricator at a Gulf port basing point price, maximum delivered price is \$2.77 per 100 lb. If purchased at Pacific Coast basing point price, \$2.80.

Transportation costs and extras as set forth in the order are added to the above. Where a fabricator sells mill lengths or random lengths in carload quantities, 25c. per 100 lb. shall be deducted; bars cut to specified lengths but not bent or otherwise fabricated, in carloads, carry a 25c. per 100 lb. deduction unless the buyer specifies in writing that mill lengths or random stock lengths are not acceptable.

The transportation provisions of the order fix switching charges

INFORMATION TO SPEED PRODUCTION

COMPLETE
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and provide that on truck deliveries from plant of fabricator to consumer, 10c. per 100 lb. may be added to the lowest applicable railroad charge for an identical quantity. In regard to f.i.t., if the fabrication in transit rate is lower than the total charge calculated pursuant to the price order, the low rate prevails.

For delivery in carload quanti-

ties in Toledo, Ohio, \$2.57. For carload quantities in Detroit, \$2.52; less than carload quantities to Detroit, \$2.61. Less than carloads to points other than Detroit in the state of Michigan, \$2.57 plus 17c. per 100 lb. and plus the difference between lowest railroad charge at carload rate and lowest applicable railroad charge for transporting an identical quantity

from Pittsburgh to point of delivery to consumer. Carload quantities to points other than Detroit in Michigan, \$2.57; plus 17c. per 100 lb. where lowest applicable railroad charge for transporting for an identical quantity from Pittsburgh to the point of delivery to the consumer is 34c. per 100 lb. or less, or the lowest applicable rail charge for an identical quantity from applicable basing point to point of delivery to consumer, where lowest applicable rail charge from Pittsburgh to point of delivery to consumer is more than 34c. per 100 lb., plus addition of applicable extras.

Spirals coiled to a specified diameter with spacers attached are \$4.45 when such spirals are 1/4-in. in diameter and \$3.95 when 3/8-in. or larger but if spacers are not furnished, 25c. shall be deducted per 100 lb. Where spirals are made of cold drawn wire, 50c. may be added. Welded stirrups are \$7.80 when 1/4-in. in diameter; \$6.55 when 3/8-in. in diameter and \$5.80 when 1/2-in. or larger.

The pricing provisions of the regulation pass on to the consumer all charges for freight from mill to fabricator and from fabricator to consumer. There are, however, these two modifications of this rule:

1. Where a fabricator obtains an advantage as the result of an "in transit" freight rate, the regulation requires him to pass this advantage on to the consumer.

2. Where delivery is made by truck instead of by railroad an arbitrary charge of 10c per 100 pounds may be made.

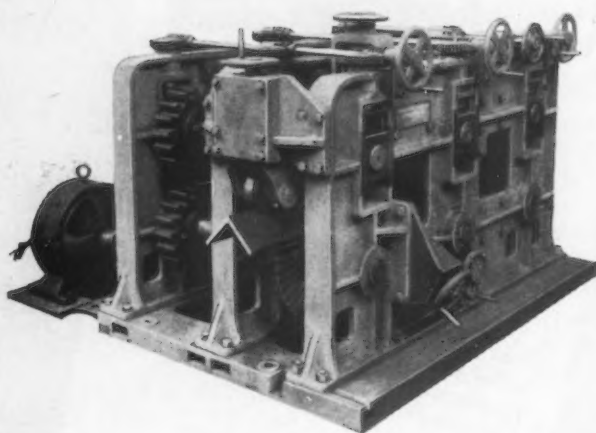
"In general the cost of bars to

Under the new price order on reinforcing bars, each fabricator must file with OPA on or before July 15 on Form 259:1 a statement of inventory as of June 1, broken down into sizes, etc., and shall file monthly beginning with third quarter on Form 259:2 a statement of sales and inventory.

the fabricator under revised price schedule No. 6 on iron and steel products is \$1.90, exclusive of freight," the price administrator said. "However, specific price differentials applicable to the Pacific Coast, the Gulf ports and Michigan are provided for by revised Price Schedule No. 6. Maximum price regulation No. 159 preserves the 50c margin by specifically allowing for these differentials. All of

Thomas Angle Planer

• • for Shipyards



Capacity for angles up to 8" x 8"

DESIGNED AND BUILT
BY THOMAS

THIS Thomas motor-driven unit is designed for planing, either straight or to any angle desired . . . a vital help in today's urgent ship or barge construction. Easy to operate, speeds production, gives maximum service! Thomas builds equipment for any special metal-forming or fabricating need. Write.

THOMAS
MACHINE MANUFACTURING COMPANY

PITTSBURGH, PA.

FABRICATING MACHINERY

PRESSES • DIES • METAL-FORMING MACHINERY

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

PRICES

these pricing provisions are based on established industry practice.

Following is Appendix B of the new price order, covering extras:

(a) (1) Size extras.		Per cwt.
	Base	
$\frac{3}{4}$ in. and larger	.....	\$0.10
$\frac{5}{8}$ in.	.....	.20
$\frac{1}{2}$ in.	.....	.40
$\frac{3}{8}$ in.	.....	1.00
(2) Quantity extras.		
Less than 20 tons, but not less than 5 tons	.....	\$0.25
Less than 5 tons, but not less than 1 ton	.....	.35
Less than 1 ton	.....	.50
(3) Bending extras.		
Type H Bending:		
Includes bars other than $\frac{1}{4}$ in. and $\frac{3}{8}$ in. bent at not more than 6 points; radius bending and types not otherwise defined as light bending		
Light bending	.....	\$0.40
Type L Bending:		
Includes all $\frac{1}{4}$ in. and $\frac{3}{8}$ in. bars or $\frac{1}{2}$ in. stirrups and column ties and all bars of any size bent at more than 6 points		
(4) Milling ends.	.....	\$0.90
Bars 4 ft. long and over	.....	\$0.20
Bars less than 4 ft.	.....	.30
(5) Galvanizing extra.		
A charge may be made for galvanizing not in excess of the actual cost to the seller of the galvanizing.		
(6) Restrictive specification extras.		
For a tensile range for structural or Intermediate Grade, more restricted than the ASTM specification, and in no case shall the deduction be more than 5000 lb. per sq. in.—Add.		
	.....	\$0.05
For a weight tolerance more restrictive than the ASTM specification of latest adoption, but in no case restricted to less than 2½ per cent over or under for lot shipments—Add.		
	.....	.10
(7) Engineering extras. (i) Detail and placing plans from designs by others.		

	Per 100 lb.	Maximum Charge
Less than 5 tons	\$0.50
5 tons to 19.99 tons35
20 tons to 199.99 tons30
200 tons to 499.99 tons20
Over 500 tons15

Minimum charge on any order, \$10.00.
(ii) Listing, \$0.05 per 100 lb.
(iii) Design: (For designing, add \$0.30 per 100 lb. to above detailing extras.)

Imported Commodities

• • • Sales of an imported commodity, if kept in its original form when sold to the Federal government or a governmental agency, are exempt from the General Maximum Price Regulation, Price Administrator Leon Henderson emphasized June 11. This applies to sales of imported commodities by sub-contractors as well as by contractors.

General Maximum Schedule

• • • An additional salvage sales company has been exempted from the provisions of the General

Maximum Price Regulation. Basis for the exemption is that these companies represent underwriters and sell damaged products that cannot be priced and classified under GMPR. Sales of J. B. Shelnutt Salvage Co., Louisville, Ky., were the latest to be exempted. The firm was the third to register with OPA for the exemption.

Poles, posts, piling, split stock, mine timbers, and similar semi-

finished timber products are subject to the General Maximum Price Regulation, OPA announced June 4.

Duty Removal Won't Boost Prices

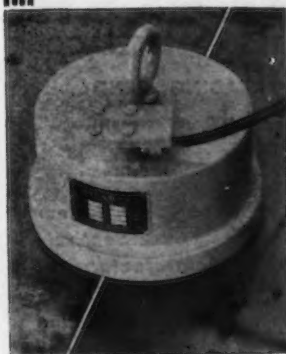
• • • Free entry of war materials imported by R.F.C. and its sub-



The STEARNS Drill Stand Magnet, a profitable investment for steel and iron fabricators. Provides greater accuracy in drilling, saw hole cutting, etc....increases operator output with less fatigue. Fits any standard old man stand, easily attached, holds with tenacious grip in any position. Will cut your fabricating costs.

The STEARNS Hand Magnet has many applications in laboratories, engineering departments, offices, for small capacity separation problems. Inexpensive in initial and maintenance cost. Our Bulletin 25-A will give you details.

STEARNS Holding Magnet or Magnetic Clamp holds plates in alignment for sheet welding quickly, safely, economically, a difficult job made easy. Feel free to consult us on fabricating problems. We may be able to help you get smoother, faster production. Investigate Stearns Magnetic methods.



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STEARNS MAGNETIC MANUFACTURING CO.

635 S. 8th St.

Milwaukee, Wis.

SEPARATORS—CLUTCHES—BRAKES—MAGNETS



sidiaries will not affect the price at which such materials are sold in the United States, Secretary of Commerce Jesse Jones reiterated June 3. These materials are sold at the ceiling prices fixed by OPA. Two days later, M.R.C. made a 25 per cent price concession to Bolivian tin producers on the purchase of 25,000 tons of concentrates.

Fluorspar Price Order

• • • Order No. 1 under maximum price regulation No. 126 (fluorspar) specifies, "Under the provisions of maximum price regulation No. 126 issued April 28, 1942, the price of \$27.40 per ton, f.o.b. Salida, Colo., for glass grade fluorspar containing not less than 97 per cent CaF_2 , 2.25 per cent SiO_2 , and no iron, is determined to be a

New NE Steel Extras Feature of Price Pages

• • • The interesting table of extra charges for the new National Emergency steels, published several times previously in *THE IRON AGE*, has been made a permanent feature in the price pages of this magazine and will be found on page 136 this week.

In general, *THE IRON AGE* confines its quotations to base prices, but in view of current emergency conditions, publication of NE steel extras is deemed a worthwhile service to readers.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of $7/16$ " metal— $16\frac{5}{8}$ " wide at ends, $14\frac{1}{4}$ " wide at center and $93\frac{1}{4}$ " long with flanges $3\frac{3}{8}$ " high at center, $2\frac{3}{16}$ " high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

PARISH PRESSED STEEL CO.

READING, PENNA.

Pacific Coast Representative
F. Somers Peterson Co.,
57 California St.,
San Francisco, California

We have turned our facilities over entirely to the manufacture of various products required by the United States Government and American Railroads.

price in line with the level of maximum prices established by said maximum price regulation for sales made by Fluorspar Processing Co., 126½ East Pikes Peak Avenue, Colorado Springs, from its mill located in the vicinity of Salida, Colo., and the maximum price at which said company may sell or deliver said grade of fluorspar."



Military Items Excluded

Washington

• • • In order to facilitate production and procurement, and in conformity with recent decisions, OPA has excluded 10 classifications of military equipment and supplies from provisions of price control regulations when sales of these essential items are made to Federal war procurement agencies. Among the items excluded from price control until Jan. 1, 1943, are certain types of ski troop equipment; one burner gasoline mountain and ski stoves; field ranges, model 1937 and parts; canteens, canteen cups, and meat cans, model M-1942; wire cutters, model M-1938; identification tags, model M-1940; metal insignia, cap and collar, for enlisted men and paratroop knives.



OPA Attitude on Wages

• • • Wage stabilization and wage freezing are two different things, said Leon Henderson, OPA administrator, in a Chicago speech last week. He expressed opposition to

wage freezing, for the reason that "there still exists a stratum of substandard wages which are too low to permit the recipients to achieve anything approaching a reasonable standard of living."

Meanwhile, OPA appears to have taken the position that wage increases beyond April 27 will not be considered as an element of cost in fixing ceilings and that administrative costs must be maintained at a "reasonable" level. In a case involving prices of refrigerators made by Sunbeam Electric Mfg. Co., OPA cut the suggested price levels and indicated that if the manufacturer wished to maintain his profit margin position, administrative costs per unit should be reduced.

Granite City Permitted To Up Plate Prices to \$47

Washington

• • • Granite City Steel Co. was granted authority to increase the base price of all carbon steel plates, base grade, to \$47 per net ton, f.o.b., Granite City, Ill., by order No. 12 under Revised Price Schedule No. 6, it was announced on Monday.

The company, which had increased its plate production from approximately 25 per cent of total output to well in excess of 50 per cent, had requested that it be allowed to charge a base price of \$50 a ton. The request was based on the assertion that current output of plates, with the subsequent decline of production of more profitable products would result in a loss of \$30,000 a month, Price Administrator Leon Henderson explained.

In setting a price of \$47, Mr. Henderson pointed out that on the basis of cost as computed by OPA the manufacturing costs of plates will be covered and that additional relief cannot be granted to Granite City merely to grant a higher rate of return on all operations. The ceiling price on plates had been established at \$42 per net ton, base grade at established basing points. On June 5, 1941, the company was granted permission to charge \$45 per net ton, f.o.b., mill for ship plates. The ceiling of \$50 per net ton for all carbon steel plates which the company requested was intended not only to cover the cost of production but to provide a profit on overall operations, it was stated.

Watson Heads Committee

• • • Walter E. Watson, vice-president of Youngstown Sheet & Tube Co., has been elected chairman of the general steel products advisory committee of OPA. The committee is one of four iron and steel industry advisory units set up last month to serve as liaison groups between OPA and the industry on any problems which may arise with respect to prices.

Other members of the general

steel products committee are: Avery C. Adams, of United States Steel Corp.; J. W. Anderson, Sheffield Steel Corp.; Homer Butts, Niles Rolling Mills Co.; Norris J. Clarke, Republic Steel Corp.; J. A. Henry, Weirton Steel Co.; Paul Mackall, Bethlehem Steel Co.; J. L. Neudoerfer, Wheeling Steel Corp.; N. H. Orr, Colorado Fuel & Iron Corp.; L. M. Parsons, Jones & Laughlin Steel Corp.; and A. C. Roeth, Inland Steel Co.

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Canadians Told of U. S. Cooperation

Toronto

• • • In an address to members of the Canadian Manufacturers' Association at the 71st annual convention here, R. C. Berkinshaw, assistant deputy minister of the Department of Munitions and Supply, chairman of the Wartime Industries Control Board, stated

that closer working relations have been definitely set up between Canada and the United States which will enable Canada to obtain larger quantities of raw materials. He stated that the United States authorities plainly desired to assist Canada's war industry and all they asked was that Canada should use materials obtained from the States as they would use them themselves—for war purposes only. He stated that Canada

has not established a formal system of priorities on materials, but had informally allocated materials for war production. The arrangement has proved flexible and successful, enabling the diversion of materials where they were most urgently needed.

F. L. Jeckell, director-general of the industry and sub-contract co-ordination branch of the Department of Munitions and Supply, asserted the time for expanding Canada's industrial production facilities is past, and henceforth, if additional capacity is needed it must be found through existing facilities in plants operating on other than war production. He advised smaller firms that his branch did not appoint sub-contractors but could recommend them to the prime contractors. He urged the would-be sub-contractors to make use of the machinery his department supplied, and outlined five points taken into consideration before recommendations were made.

Dr. J. R. Petrie, director of the newly formed displaced industries division of the Department of Munitions and Supply, said that where possible in the conversion of Canadian industries to wartime production his department had been formed. Dr. Petrie gave definite warning that the government was not planning to subsidize non-war industry and that compassion did not enter into the picture. The industries not equipped for making essential products would find themselves shelved for the duration. Peacetime standards no longer prevailed, Dr. Petrie stated. He continued: "If you cannot be geared into our war economy, you must go. There is no room for official or unofficial commiseration by this department. There is no place for compassion in sound procurement policy. We will not—cannot—follow a policy of subsidizing non-war industry with United States dollars or British pounds." Increasing shortages of raw materials would force more and more industries to become displaced, he stated.

Dr. Petrie stated: "Scores upon scores of businesses have already closed up. Untold numbers will invariably follow. Our economy is being put through the wringer of total war, and the squeeze will be intensified as we eventually

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- **A HIGH FLASH POINT**—The possibility of fire hazard is reduced to a minimum.
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wrest the enemy's production superiority from him. There is no real security in the future of civilian production. We feel that almost any non-war industry is a potential customer for the displaced industries division.

"The only way in which we can help displaced industries is to buy needed supplies from them. This must be done in accordance with sound purchasing practice. In the case of many types of war stores there is already ample of surplus productive capacity in existence. Under these circumstances we cannot justify placing war orders with a displaced industry at prices higher than those paid to established sources of supply. When the demand for a war store increases so that new productive capacity must be created, we are prepared to place educational orders with displaced industries. Temporarily we can pay higher prices than those being paid to experienced producers. This practice will enable new producers to base their final prices on actual experience. Educational orders, however, would be the exception rather than the rule.

"If displaced industries are to get war orders in cases where ample productive capacity already exists, they must quote the lowest price consistent with quality and delivery. If the displaced industry's capacity is useful for war production, an opportunity will be given for that industry to tender on war stores which it is equipped to produce, and every effort will be made to assist in securing sub-contract work for that industry. Our experience has indicated that by far the best opportunity for most displaced industries lies in the field of sub-contracting."

Prices Established for Canada's Cobalt Ores

Ottawa

•••G. C. Bateman, Canadian metals controller in the Department of Munitions and Supply, announced that arrangements have been completed for the purchase of Canadian cobalt ores or concentrates containing 8 per cent or more of cobalt and up to 500 ounces of silver per ton at a price increase of approximately 10 per cent over prevailing rates. "These arrangements have been made to

build up a reserve stock of cobalt and at the same time to furnish an outlet for Canadian ores or concentrates," Mr. Bateman said. For ores or concentrates containing 10 per cent and over of cobalt, the new price will be \$1.10 per pound contained cobalt. The lower grades will be paid for on a proportionate basis. Until further notice all purchases will be made through Deloro Smelting & Refining Co., Ltd., Deloro, Ont., acting as buying agent for the metals

controller. The new tariff basis will be in effect until Dec. 31, 1942, subject to review, should conditions warrant. Purchases will be made f.o.b. rail cars, Cobalt, Ont., or other equalized freight shipping point to destination, specified by the buyer.

The inclusion of silver in the new price established for cobalt, is because practically all the latter material is a by-product of silver mining, and comes from the Cobalt section of Ontario.



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Preference Rating Extensions Now Under Single Standard Form

Washington

••• To reduce the paper work required in the extension of preference ratings, WPB approved a single standard form of certification. Effective July 1, any preference rating, no matter how as-

signed, may be applied or extended by a single form of certification which states merely that the purchaser certified to the seller and to WPB that he is entitled to use the preference ratings indicated on his purchase order, in accord with

Priorities Regulation No. 3 which establishes the change.

Provisions of existing orders which require a purchaser to furnish his supplier with copies of preference rating orders or other special certifications are all rescinded, except for the special provisions of Priorities Regulation No. 9 pertaining to exports.

The amended Regulation No. 3 restricts extension of preference ratings, in most cases, to material which will be to, or physically incorporated in, a product delivered to the person to whom the rating was originally assigned, or which will be used to replace inventory materials so delivered, subject to definite limitations. A rating may not be extended to replace inventories except to the extent necessary to restore it to a practicable working minimum. No rating higher than A-1-b may be assigned to orders for replacement of materials in inventory, even though the order for which the materials were used may have carried a higher rating.

A "basketing" provision permits the simultaneous extension of ratings which have been assigned by different preference rating certificates or orders on a single purchase order. When ratings are basketed in this way, the lowest rating may be extended for the whole order, or the various items in connection with which the ratings are extended may be listed separately, with the corresponding rating applied to each.

Special provision is made for small manufacturers not operating under the Production Requirements Plan. Such producers may extend ratings to deliveries of operating supplies including lubricants, small perishable tools, etc., which are required and will be consumed in filling the rated order which they are extending, but the cost of such operating supplies must not exceed 10 per cent of the cost of the materials to which the rating is extended and to which such supplies are used to process. Not more than 25 per cent of the operating supplies obtained in this way during any month may be metals in the forms described in the metals list of Priorities Regulation No. 11.

Class I producers as defined in Priorities Regulation No. 11—large users of metals required to apply under the PRP—are prohibited from extending ratings for any

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purpose after July 1. They must file PD-25-a applications to obtain their materials requirements, and they may apply only ratings assigned on their PRP certificates or rating specifically assigned on PRP certificates, like all other ratings, will be applied by the standard form of certifications prescribed by the amended Regulation No. 3.



Revisions to M-21

• • • Because it conflicts with the newly adopted Allocation Classification system, it is reported WPB will revise M-21 by eliminating all group and product classifications of iron and steel. This order, as it stands, requires separate purchase orders for each group classification whereas the allocation system permits purchases on one order with classifications indicated by percentages.



Plate Consumption Report

• • • The steel plate consumption report, PD-299, and the instructions applicable thereto have been revised. The report is now printed by WPB for each month, and forms will be sent out on or about the 15th of each month. The report is to be submitted in duplicate, and the June report must be in by July 7. Space has been added on the form for monthly plate fabricating capacity, and the description of "inventory" has been amplified.



Laboratory Equipment

• • • With certain exceptions, WPB prohibited by order L-144 the sale, rental, or delivery of laboratory equipment in which any of the following materials are contained: Aluminum, chromium, copper, iron, magnesium, molybdenum, nickel, steel, tantalum, tin, titanium, or any alloy of these metals. Rubber, synthetic rubber, and non-cellulose pastics are likewise barred.

In order to buy or sell laboratory equipment containing the above materials, a certification must be made by a duly authorized official of the purchasing company or laboratory stating that the equipment

will be used only for one of the following purposes: (1) Research on, or analysis of, materials; (2) research by or for government agencies or Lend-Lease countries; (3) for training of personnel for the Army and Navy or other government departments or Lend-Lease countries; (4) to the extent necessary for the replacement of essential existing equipment in laboratories affecting the public health,

and in Federal, State, and local government laboratories; (5) to the extent necessary for repair parts and operating supplies for maintenance of existing essential equipment and activities in laboratories, and (6) for any use which the Director of Industry Operations determines necessary and appropriate in the public interest.

Manufacturers will obtain the necessary amounts of critical ma-

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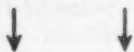
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materials for purposes permitted by the order by filing PD-25-a applications under PRP. Distributors, wholesalers, and jobbers needing priority assistance should file PD-1-x forms with the Distributors Branch of the WPB.



Cold Drawn Seamless Tubes

• • • Because of the critical shortage of cold drawn seamless

steel tubing, WPB, in a letter to consumers, asked that substitute be used wherever practical. Such substitutes as hot rolled seamless, electrically welded, gas welded, lap welded, butt welded, or lock joint tubing were suggested for consideration. Unless by voluntary action on the part of the users of tubing, the capacity of the cold drawn seamless tubing industry is conserved for only those essential applications, it will be necessary for

the WPB to take drastic regulatory action.



Household Commodities

• • • WPB ordered unrestricted production of wooden pails and tubs, and permitted the manufacture of carpet sweepers, curtain rods, fixtures and drapery attachments out of any inventories on hand prior to April 1, by an amendment to order L-30. Restrictions of the original order are removed on any pail or tub which contains metal only in hoops, bails, ears and handles, provided the total weight of the metal does not exceed 15 per cent of the weight of the article.



Tin Conservation

• • • A proposed amendment to order M-81 to curtail further the use of tin in the manufacture of containers for vegetables and certain other specified products was discussed at a recent WPB sub-committee meeting. While the terms of the amendment have not yet been definitely decided upon, chemically treated blackplate would be substituted for tin and terne plate in making can ends for these products. Electrolytic tin plate will be used for making can ends for packing another group of commodities, principally vegetables. The proposed changes in the order will reduce tin use in can manufacture covered by the order to about 12,000 tons, against 18,000 tons permitted under the original M-81.



Mining Equipment

• • • Rated orders now are necessary before mining machinery produced from material under a preference rating can be delivered. Provision to this effect was made in an amendment to order P-56-a. It requires mining machinery made from materials obtained on a preference rating shall be delivered by the producer only to an operator as defined in order P-56 or P-58, or to a producer as defined in order P-68 or P-73 and only to fill an order bearing a preference rating assigned under these orders.

WPB also announced that material necessary for repair and

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. . . Wire used in making springs is usually subjected by reliable spring makers to a number of tests . . . by Hunter, for example, to a tensile test, twist test, bend test, hardness test—and many others. Yet even these tests do not reveal a category of defects known simply as "seams". The detection of seams involves a scientific method known as Magnaflux inspection. Sketchily, the procedure consists

of magnetizing the spring, powdering with iron "dust", and inspection. This method is used to test samples of wire, for "jump" inspection of springs, and occasionally for 100% inspection. A lot of fuss to make over a spring? Not at all. Hunter makes such tests to catch flaws and learn why they occur, to aid in improving materials, to deliver the best springs scientific manufacture can produce for you.



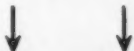
HUNTER
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PRIORITIES

maintenance of houses owned by a mining operator and used for the housing of miners cannot receive as high a preference rating as material necessary for the actual operation of the mine.

Interpretation No. 1 to order P-56, as amended, provides that an A-10 rating is available for such repair and maintenance material. Material necessary for operation has an A-8 rating.



Cobalt Nickel Oxide

• • • Cobalt nickel oxide that cannot be practically separated into its component metals may be used in the manufacture of ground coat frit under the terms of an amendment to order M-39-b. If the compound can be separated, the amendment restricts its use. There are no restrictions on the sale or use of ground coat frit containing cobalt in commercially non-recoverable form. Frit is used in porcelain enameling steel and in making glass.



Marking Stamps

• • • Metal marking stamps are excepted from the restrictions of M-126 by an amendment. While such stamps are not used by the armed forces, many plants in war production make extensive use of them.



Steam Equipment

• • • Order L-117 has been amended to permit production, sale, and delivery of heavy powered steam equipment not provided in the original order. The original order limited deliveries to orders bearing an A-9 rating or higher assigned by PD-1, PD-1-a, PD-3, PD-3-a, and P-19-b certificates. The amendment permits deliveries on these ratings and also on ratings of A-9 or higher assigned by PD-2, PD-4, PD-5, PD-5-b, PD-24, and PD-25-a certificates.



Imports

• • • To control imports of commodities for civilian use as well as strategic material imports, be-

ginning July 2, WPB issued an amended version of order M-63. The order's purpose is to take advantage of available shipping space by requiring that commodities be imported in the order of their importance. This is accomplished by attaching to the amended order, Lists I, II, and III and setting up rules for the importation of commodities on each list. The lists specify that forms

PD-222-a, PD-222-b, and PD-222-c are to be filed, according to instructions in the order.

The only limitation placed upon use of approved ratings under PD-25-a is to be prohibition of acceptance of more than 40 per cent of the deliveries of any one metal authorized for the whole quarter within one month of the quarter, or more than 80 per cent of the first two months, unless ex-

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cess delivery is unavoidable due to minimum commercial quantities or unless authorized by WPB. Interim relief forms (PD-25-f), when "certified" by the industry branches and the supply arms and bureaus of the armed services, will be given special and instantaneous attention by the administrative organization, subject only to the existence of sufficient supply of ma-

terial in the reserve pool or "kit-ty."



Farm Machinery

• • • To assure delivery of essential equipment to farmers, WPB ordered that products manufactured under the farm machinery and equipment program must

actually reach the farm and must not be diverted to industrial or other non-agricultural uses. Order L-26-d makes it clear that farm equipment, machinery, and attachments should not be sold for any use except the production or care of crops, livestock, or other produce on a farm or on a poultry-raising farm. This restriction does not apply to orders bearing A-9 ratings or higher, or to repair parts.

Amendment 3 to order P-95 permits deliveries of iron and steel to farm equipment producers after June 30 provided the iron and steel has been scheduled for rolling and rolling has actually commenced before that date. This order, which makes available A-1-a ratings to manufacturers to obtain materials going into the production of certain farm equipment, originally provided that the ratings could not be used to obtain material not scheduled for delivery by June 30.



Welding Rods

• • • Distribution of welding rods and electrodes except to the armed services and allied governments are confined to orders bearing a preference rating of A-9 or higher by order L-146. Alloy electrodes or rods, which means ferrous base rods whose core wire contains more than 2 per cent by weight of metal plus the iron or carbons, may not be made except for deliveries bearing A-1-j ratings or higher. A 6 per cent monthly pool of each type of rod or electrode delivered by a manufacturer is provided. Rods for repair and maintenance must be so specified on orders, and purchasers must not use such rods for other purposes. No inventories over 60 days are permitted.

Manufacturers must file records of all shipments with the WPB on form PD-528 by the 18th of each month. Specific exceptions are made for schools.


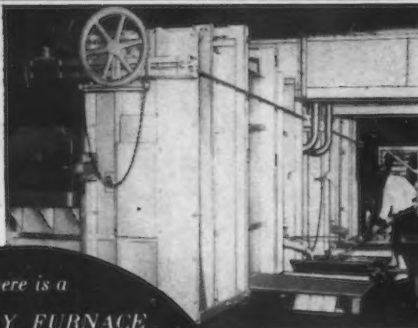


Track Laying Tractors

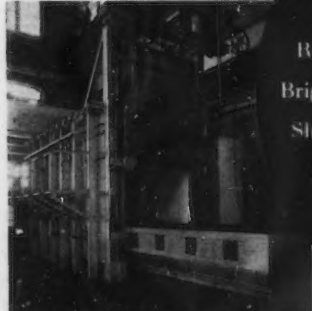
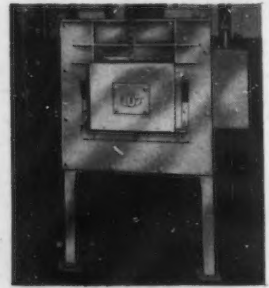
• • • A tightening of the control on the distribution of track-laying tractors and auxiliary equipment was seen in an amendment to

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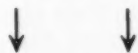
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order L-53, which prohibits any person from selling, leasing, delivering, or transferring any new track-laying tractors or auxiliary equipment, regardless of preference rating, except upon a specific release issued prior to June 15 or upon specific authorization. The amendment does not prevent a dealer or any other person from delivering or accepting delivery of auxiliary equipment to be mounted on a specific track-laying tractor in the possession of an ultimate consumer.



Industrial Equipment

••• Restrictions pertaining to date of delivery of general industrial equipment covered by Order L-123 were clarified by WPB on Saturday. Equipment in transit prior to May 26 was ruled not to be subject to the order's restrictions. The interpretation says that such equipment is considered to have been delivered prior to May 26 if it had been placed in the hands of a common or contract carrier for shipment to the purchaser before that time.



Transportation Rulings

Export Shipments

Washington

••• Revised instructions to shippers, governing movement of goods into United States ports for offshore shipments, have been issued by the ODT. Shippers are now not required to apply directly to the War Shipping Administration or the British Ministry of War Transport for permission to move export goods through the ports.



Freight Forecasts

••• To bring about greater utilization of existing freight transportation facilities, ODT has initiated a plan designed to provide monthly an accurate forecast of the nation's freight equipment requirements. Producers, manufacturers, and distributors have been asked to submit, beginning June 15, an advance monthly estimate of traffic movement from their establishments. This information, to be provided on a special form.

J & L Cleared of Priority Violation Charges

Pittsburgh

••• Jones & Laughlin Steel Corp. in Federal Court here early this week was completely cleared by the U. S. Government of any implication of lack of patriotism in handling priorities, and this fact was included in a "consent" order signed in Federal Court by the two parties.

Jones & Laughlin stood on its

answer filed June 11, denying that it had "violated regulations or orders or directions" of the War Production Board. The consent order agreed to in Federal Court by the two parties ordered that Jones & Laughlin should comply with the orders of the War Production Board, an action which the company claimed in its answer it has been consistently doing.

Pointing out that Jones & Laughlin feels that the time a



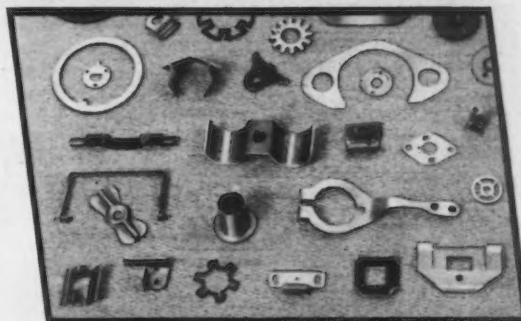
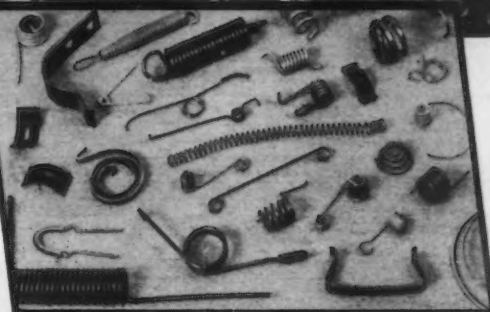
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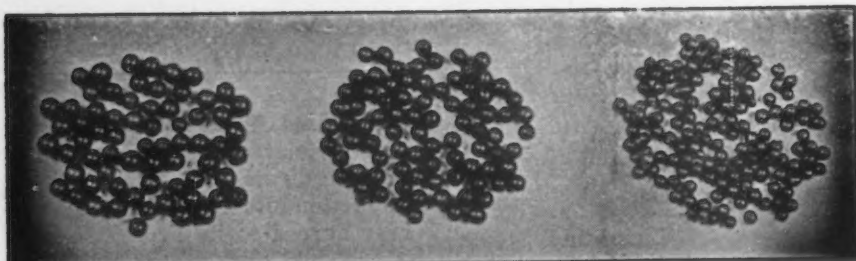
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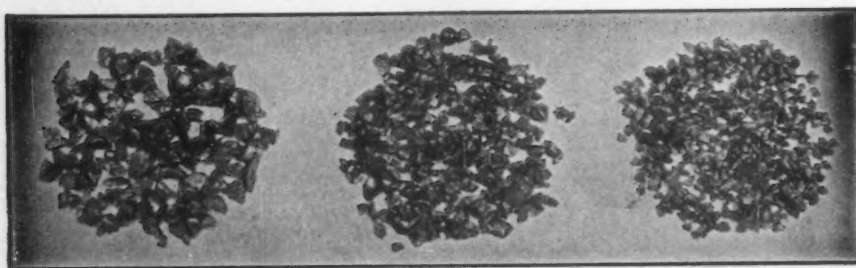
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trial would require from important WPB officials and from officers and key employees of the corporation would be more profitably spent in prosecution of the war effort, former-judge Elder W. Marshall, company counsel, said, "with the tremendous united effort the war requires from every one of us, the Jones & Laughlin Steel Corp. is unwilling to engage further in any controversy with the government about priorities. Jones & Laughlin is and has been energetically conducting their operations in complete accord with the regulations orders and directions of the War Production Board. . . . All employees of the company are proud of their record of accomplishment in furnishing essential steels for the armed forces of United States and the United Nations."

In denying point by point practically every accusation listed in the governments complaint alleging priority violation, Jones & Laughlin Steel Corp., in its answer filed last week, asserted that the constantly changing regulations of the WPB and its predecessor, OPM, coupled with the fact that these orders "have not always been consistent with each other, or well understood, or susceptible of complete compliance," accounted for some minor violations of priority regulations.

In denying specific instances of priority violations, the company claimed that none of the shipments in any way interfered with delivery of steel on high priority orders and that in some cases the delivery complained of was made on direct order from the WPB or other Government Agencies. It was also explained that in some cases steel had been made for specific orders before regulations affecting that steel were issued, and, as the steel was not suited for other products, it was finished as the product for which it was originally intended, such as steel pipe.

None of the companys actions detailed in the complaint have in any way been a hinderance to the accomplishment of the purposes of the National Defense Act and of The War Powers Act, the company's answer stated.

Jones & Laughlin, according to its counsel, asserted in the decree

COMING EVENTS

June 21 to 25—American Water Works Association, Chicago.
 Aug. 23 to 30—National Association of Power Engineers, New Orleans.
 Sept. 1 to 11—Building and Construction Trades Council, Atlantic City, N. J.
 Oct. 5 to 9—National Safety Congress Association, International convention, Baltimore.
 Oct. 12 to 16—National Metal Congress and Exposition, Cleveland.
 Nov. 30 to Dec. 5—National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

that its entire production is being delivered in compliance with WPB orders and regulations and such action will continue.

In stating that the government had no wish to question the patriotism of Jones & Laughlin Steel Corp. or its officers, John Lord O'Brian, general counsel for WPB, said that the consent decree gave the government the relief asked for in the complaint.

Jackson Iron & Steel Co. Blows in New Blast Furnace

•••The Jackson Iron & Steel Co. blew in a new air-conditioned blast furnace June 8. The furnace was lighted by Miss Anna Davis, sister of D. D. Davis, president of the company, with the same torch with which she lighted the original stack on Oct. 6, 1908.

The dismantling of the old stack and erection of the new was done by William B. Pollock Co., Youngstown, Ohio. The schedule called for 3 months, but the new furnace was lighted just 70 days after the old one was blown out.

Republic Plant to Lift Capacity by Half

•••Construction of an addition to a New York area plant of the Steel and Tubes Division of Republic Steel Corp. has been authorized by the Defense Plant Corp. and work is to be started at once. It will increase by approximately 50 per cent the production capacity, area and employment at this plant, which is now engaged exclusively in production of electric weld tubing for war uses.

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Stewart is qualified to give you production runs of iron, steel and wire parts and sub-assemblies involving the use of facilities listed. 350,000 Sq. Ft. of floor space; two railway sidings; truck loading platforms. Competent engineering and production staffs. Deliveries prompt; quality workmanship. Financial rating highest obtainable. To expedite inquiries, send specifications and full information.

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This Week's Priorities and Prices

Military supplies amendment No. 2 to supplementary regulation 4 to the general maximum price regulation was corrected, effective June 10. (OPA-PM3658)

Preference rating extensions and use are simplified and standardized by amended Priorities Regulation No. 3, effective July 1. (WPB-1328)

Laboratory equipment production, sale, and delivery was placed under complete control by order L-144, issued June 12. (WPB-1331)

Steel used in producing hand service tools is limited as to type by order E-6, issued June 12, which also limits the orders which producers of such tools may fill. (WPB-T450)

Mining machinery produced from materials obtained on rated orders cannot be delivered except on rated orders according to amendment to P-56-a and an interpretation to order P-56, issued June 12. (WPB-T451)

Coal burning heating stoves, six types, are covered as to price by orders 4 and 5 to revised price schedule 64, effective June 12. (OPA-PM3626)

Imported commodity sales to the Government or to Governmental agency are exempt from the general maximum price regulation if the commodity is kept in its original form when sold. (OPA-PM3631)

Iron and Steel Branch personnel changes were announced by Chief Reese Taylor. (WPB-T443)

Attention is called to amendment 2 of L-97-a-1 which permits free exchange of material between producers and suppliers for construction or repair of railroad car-parts only if the material had been obtained under a preference rating for the construction of cars. (WPB-T447)

Concrete reinforcing bar prices were regulated by

maximum price regulation 159, effective June 15. (OPA-PM3595)

Military supplies, 10 classifications, were excluded from provisions of price control regulations when sales are made to war procurement agencies by amendments to supplementary regulation 4 to the general maximum price regulation and to revised price schedule 64, effective June 10. (OPA-PM3610)

Farm equipment, under order L-26-d, issued June 8, must be delivered for use on farms. Amendment 3 to P-95, affecting farm machinery industry, was also issued. (WPB-1322)

A flow of materials pattern to wartime industry, embodied in Priorities Regulation No. 11, was issued June 10. (WPB-1324)

Cobalt-nickel oxide may be used in manufacture of ground coat frit by amendment No. 1 to order M-39-b, issued June 6. (WPB-T443)

Welding rods and electrodes are placed under strict distribution control by order L-146, effective June 13. (WPB-T435)

Second hand machinery and electrical products maximum price regulation 136 becomes effective July 1. (OPA-PM3579)

Iron and steel use in mattress or pad production is prohibited after Sept. 1 by amendment No. 1 to order L-49, issued June 8. (WPB-PM1314)

Tin used in container manufacture for vegetables and certain other products will be curtailed further by a proposed amendment to order M-81. (WPB-T429)

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 means announcement 600 issued by the War Production Board.)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-9-c... Interpretation No. 4 (6-15-42) prohibits use of copper and alloys in manufacture of pipes and fittings for use in water supply and distribution systems except corporation cocks and curb stops.

M-15-b-1... Amendment No. 6 (6-12-42) requires use of more reclaimed rubber and less crude in manufacture of industrial pneumatic and solid tires, and establishes specifications for rubber insulating tape.

M-15-d... Requires buyers of new airplane tires to obtain certificates stating necessity of purchase. Related form: PD-410.

M-39-b... Amendment No. 1 (6-6-42) permits use of cobalt-nickel oxide in manufacture of ground coat frit.

M-47... Amendment No. 1 (6-12-42) to order as amended 5-2-42 permits Commodity Credit Corp. to purchase frozen stocks of burlap.

M-81-a... Orders certain can manufacturers to substitute electrolytic tin plate and chemically treated blackplate for tin plate where possible.

M-96... Amendment No. 1 (6-13-42) broadens order to include material in wet and dry forms.

M-126... Amendment No. 1 (6-9-42) excepts steel stamps used for marking metal from terms of order.

Under "P Orders," page 13, add:

P-56... Interpretation No. 1 (6-12-42) provides that an A-10 rating is available for repair and maintenance material. Material for operation has an A-8 rating.

P-56-a... Amendment No. 3 (6-12-42) provides that mining machinery made from material obtained on a preference rating shall be delivered by the producer only to an operator as defined in orders P-56 or P-58, or to a producer as defined in orders P-68 or P-73, and only to fill a rated order.

P-95... Amendment No. 3 (6-8-42) permits iron and steel deliveries after June 30 if material has been scheduled for rolling and rolling has commenced for farm machinery.

P-129... Interpretation No. 1 (6-5-42) assigns an A-3 rating for deliveries of materials essential for maintenance, and repair and protection of service of radio and wire communication operations.

P-130... Interpretation No. 1 (6-5-42) makes an A-3 rating available for deliveries of materials going into normal operation construction of telephone companies.

Under "L Orders," page 19, add:

L-20... Amended (6-8-42) to further restrict use of cellophane or other transparent cellulose sheets of 0.003 in. or less in thickness.

L-26-d... Makes plain that delivery of essential equipment to

farmers under farm machinery and equipment program must actually reach the farm and must not be diverted to industrial or other non-agricultural uses.

L-28... Amendment No. 1 (6-8-42) curtails further use of critical materials in manufacture of light bulbs. Related forms: PD-417 and PD-532.

L-30... Amendment No. 3 (6-12-42) permits manufacture of certain household goods under restricted conditions.

L-49... Amendment No. 1 (6-8-42) prohibits after Sept. 1 the use of iron or steel in the production of mattresses or pads.

L-53... Amendment No. 1 (6-15-42) prohibits transfer of any new truck-laying or auxiliary equipment regardless of preference rating except on specific authorization.

L-78... Amendment No. 2 (6-13-42) releases from sales restrictions of order fluorescent lighting fixtures using tubes rated at 30 watts or less, and extends order until Sept. 1.

L-97-a-1... Amendment No. 2 clarified and corrected.

L-107... Limits shipments of certain types of space-heating equipment to Army, Navy, Maritime Commission, and Coast Guard orders. Related forms: PD-412-a and PD-467.

L-117... Amendment No. 2 (6-8-42) permits production, sale, and delivery of heavy power and steam equipment on ratings of A-9 or higher assigned by certain additional certificates.

L-123... Interpretation No. 1 (6-13-42) states that equipment covered by the order is considered to have been delivered prior to May 26 if it had been placed in hands of common or contract carrier for shipment before that time.

L-136... Curtails use of critical material in the manufacture of church goods (6-13-42). Related form: PD-417.

L-144... Prohibits sale and delivery of laboratory equipment except for certified essential uses (6-12-42). Related forms: PD-25-a and PD-1-x.

L-145... Effective June 9, a bearing producer may not accept any purchase order for any sizes specified on an exhibit attached to L-145 unless he is designated as an "authorized producer" of the size sought. (6-6-42)

L-146... Places distribution of welding rods and electrodes under strict control, and defines permitted deliveries (6-6-42). Related form: PD-528.

L-152... Permits continued production of baby carriages, but requires they contain none of the more critical metals and only a minimum of iron and steel (6-13-42). Related form: PD-423.

Under "E Orders," page 32, add:

E-6... Limits the type of steel which may be used in producing hand service tools and limits the orders which producers of such tools may fill.

Under "Priority Regulations," page 33, add:

No. 3... Amended (6-10-42) to establish a uniform method of application and extension of preference ratings, in accord with PRP. Will cover all such applications and extensions except for special provisions of Priorities Regulation No. 9.

No. 11... Production Requirement Plan, permitting complete control of all scarce materials (6-10-42).

Specific Instructions to Allocation Classification

• • • The instructions for industries operating under the Allocation Classification system, established by the Production Requirements Plan, order P-90, are concluded with this issue. Classes 1.00 to 10.00 and 11.00 to 15.00 were covered in the two preceding issues of THE IRON AGE. The complete symbol classifications for Military, Industrial, and Civilian industries are shown in The Iron Age Priorities Guide, 6th edition, of June 4th.

Class 16.00—Equipment and Supplies for Household Use

As defined here, equipment and supplies for household use cover purchase orders for companies manufacturing all movable equipment including home, portable, and automobile radio receivers, furnishings and supplies used in homes, hotels, restaurants, laundries, dry-cleaning and pressing establishments, but not food products, health supplies, and other items specifically included in other classifications.

Manufacturers of such articles as beds, carpets, chinaware, cooking utensils, cutlery, electrical appliances for domestic use, all types of laundry equipment, silverware, stoves, glassware, etc., should place this allocation symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 17.00—Education and Information

17.10—Printing and Publishing

All publishers of newspapers, magazines, and books and all establishments engaged in lithographing, photo-engraving, blue-printing, photo-stating, etc., should place this allocation symbol on all purchase orders that they issue.

The symbol does not apply, however, to such things as playing cards, etc., which should be placed in class 18.00.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

17.20—Education

Schools, colleges, universities, and other educational institutions should place this allocation symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 18.00—Recreation and amusement

Businesses engaged in the manufacture of photographic equipment and supplies, athletic and sporting goods, musical instruments, etc., and businesses which operate carnivals, amusement parks, theatres, etc., or produce motion pictures should place this symbol on all purchase orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 19.00—Equipment and Supplies for Office Use

This allocation symbol should be used by manufacturers of such things as adding and calculating machines, typewriters, pencils, stationery, mimeograph machines and office furniture on all their purchase orders except for the construction of new buildings and building maintenance and repair (see classes 21.00 and 22.00).

Class 20.00—Machinery and Equipment for Industrial Use

This classification should be used on all purchase orders by makers of industrial machinery and equipment. Industrial machinery is defined as all machinery, except office machinery, customarily carried as a capital item, and used for manufacturing purposes. It does not include any equipment or machinery physically incorporated in any end product included in another heading of this classification.

The special purpose machinery and equipment necessary to provide the essential services listed in the classification, such as power and light, transportation and communication, are not included in this classification as they are separately listed classes but the machinery used in the manufacturing of these

special purpose facilities is included. To illustrate, locomotives, trucks, generators for a light and power plant, equipment to provide telephone service, diesel engines or turbines for ships are not included in this classification but are covered by their respective listed classifications. The machinery used to manufacture the locomotive, truck, generator, telephone equipment, diesel engine or turbine is, however, included under this symbol.

20.10—Metal Working Machinery

Manufacturers of machine tools and metal working machinery should place this classification number on all orders for materials.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

20.20—All Other Industrial Machinery Including Mining, Construction, Special and General Industrial Machinery

Manufacturers of mining machinery, construction machinery, special purpose industrial machinery such as textile machinery, and general industrial machinery such as conveyors, should place this allocation symbol on all orders that they issue.

Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Class 21.00—New Buildings, Construction of

The prime contractor has the responsibility for placing these allocation symbols on all purchase orders he issues for materials and equipment for the construction of all types of civilian and industrial buildings. These classifications numbers should be placed on orders for all items which are actually incorporated into the building itself, that is, such things as elevators, escalators, plumbing and heating systems, wiring, incinerators and air-conditioning systems where they are actually attached to and form part of the building. Portable air-conditioning units, industrial machinery, refrigerators, stoves, and other similar items

should not be included under this symbol. Orders for materials for the construction of government-owned war facilities should be assigned class 7.00 symbols.

21.10—Buildings for Manufacturing and Commercial Purposes, Construction of

This allocation symbol should be placed by the prime contractor on all orders for materials, equipment, etc., for buildings such as: All types of buildings for industrial plants including assembly and warehouse buildings, all types of railroad buildings, buildings for electric generator plants, hangars, commercial and private, and other commercial airport buildings, mine buildings, office buildings, stores, telephone control offices, and repeater stations, etc.

21.20—All Types of Dwellings, Construction of

This allocation symbol should be placed by the prime contractor on all orders for materials, equipment, etc., ordered for buildings such as: Apartment houses, civilian barracks, clubs, homes, hotels, etc.

21.90—All Other Types of Buildings, Construction of

This allocation symbol should be placed by the prime contractor on all orders for materials, equipment, etc., for buildings such as: Farm outbuildings, barns, fire stations, garages, greenhouses, health centers, hospitals, jails and prisons, kennels, motion picture houses, police stations, public buildings (except dwellings, see class 21.20).

Class 22.00—Operating Supplies and Building Repair and Maintenance

NOTE: This classification is intended primarily for manufacturers of articles and supplies usually designated as "operating supplies."

This classification is provided for manufacturers of operating supplies and building repair and maintenance supplies. Operating supplies are defined here as those supplies which are consumed in the manufacture of a product or are necessary for maintaining the manufacturing process, but are not physically incorporated into or are not a component part of the finished product. These operating supplies include such items as small tools, cordage and twine, electric light bulbs, grease pumps and guns, etc.

This symbol will be transmitted by the manufacturer of operating supplies. Manufacturers falling under other classifications will not use this classification but will place on their orders for operating supplies their own allocation symbol. For example, a manufacturer of automobiles who orders screw drivers will use classification 10.20 on his orders. The company which manufactures the screw drivers will transmit the symbol 22.00 on his orders.

Building repair and maintenance includes the manufacturers of such products as plumbing and heating supplies, electrical wiring, ornamental grill work, door and window sash, etc., which are not identifiable as going into new construction. In other words, orders for the above supplies not coming under classes 21.10, 21.20, or 21.90 will be listed as class 22.00.

Any items listed in other classifications as, for example, working gloves, (Class 15.00)—wearing apparel, or repair parts for items listed in other classifications, such as repair parts for autos and trucks, should not be included in this classification.

Class 23.00—All Other Uses

(NOTE: This does not include finished products listed in other classes.)

Manufacturers who do not directly fall into any other classes in the allocation classifications as set forth above or whose products, such as sub-assemblies, are not incorporated into some other final product, should place this allocation symbol on all purchase orders that they issue.

It should not be used by manufacturers whose products can be classified as repair, maintenance and operating supplies for any construction or manufacturing operation listed here or by manufacturers or processors of sub-assemblies, semi-finished products or parts that enter into a finished product, or by manufacturers whose products are used in the repair and maintenance of existing buildings. Construction of new buildings and building maintenance and repair should not be included in this classification (see classes 21.00 and 22.00).

Examples of those who should use the allocation symbol are manufacturers of artists' materials, jewelry, clocks, watches, luggage, novelties, etc.

Manufacturers of such things as bearings, motors, and sub-assemblies should not use this allocation symbol but should transmit those symbols which are transmitted to them on the orders received from their customers.

Steels for Hand Service Tools Restricted by WPB Order

Washington

• • • General Preference Order No. E-6, directs that makers of hand service tools shall use no alloy steels in the manufacture of such tools other than the following series: SAE 1300, SAE 4000, NE 8000, NE 8100, NE 8200, NE 8300, NE 8400 and SAE 9200. The order covers the manufacture of chisels and hammers of all types, metal cutting snips and shears, pliers, punches, screw drivers and wrenches. None of these hand tools can be delivered on priority ratings lower than A-10.

The only National Emergency steels of the above series presently available are NE 8024, NE 8124, NE 8233, NE 8245, NE 8339, NE 8442 and NE 8447, according to a recent list of available NE steels. Inventories of alloy steels which do not correspond to the restricted list may be processed, however.

WPB Official Urges 41,500 Oil Derricks Be Scrapped

Washington

• • • Scrapping of 41,500 useless oil derricks would yield more than 300,000 tons of iron and steel scrap, according to M. R. Singleton, salvage director of the petroleum industry for the Industrial Salvage section of WPB's Bureau of Industrial Conservation. Mr. Singleton said that most of the oil wells in this country can dispense with fixed derricks by using itinerant truck-drawn hoisting equipment. Bureau officials estimate that Oklahoma can scrap 15,900 derricks; Kansas, 11,800; North Texas and the Panhandle, 3800 and East Texas, 10,000.

"Three months ago," he said, "the petroleum industry began its salvage campaign. So far it has collected and moved back to the mills about 335,000 tons of iron and steel scrap, and 16,000 tons of non-ferrous metals. A harvest of the seldom used derricks should realize an equal amount."

May Output of Ingots Close to Record

YEAR 1941

Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,274,780	99.0	451,806	76.0	195,766	89.1	6,922,352	96.8	1,562,608	4.43
February	5,669,425	99.1	378,536	70.5	182,393	91.9	6,230,354	96.5	1,557,589	4.00
March	6,457,641	101.9	460,225	77.4	206,137	93.8	7,124,003	99.6	1,608,127	4.43
1st Quarter...	18,401,846	100.1	1,290,567	74.8	584,296	91.6	20,276,709	97.7	1,576,727	12.86
April	6,137,613	100.0	395,056	68.6	221,510	104.1	6,754,179	97.6	1,574,401	4.29
May	6,362,245	100.4	444,079	74.7	238,241	108.4	7,044,565	98.5	1,590,195	4.43
June	6,098,171	99.4	458,848	79.7	235,732	110.8	6,792,751	98.1	1,583,392	4.29
2nd Quarter..	18,598,029	100.0	1,297,983	74.3	695,483	107.8	20,591,495	98.1	1,582,744	13.01
1st 6 months	36,999,875	100.0	2,588,550	74.6	1,279,779	99.7	40,868,204	97.9	1,579,753	25.87
July	6,085,100	94.4	489,297	85.0	237,827	85.7	6,812,224	93.3	1,541,227	4.42
August	6,244,353	96.6	495,761	85.9	257,382	92.6	6,997,496	95.6	1,579,570	4.43
September ..	6,054,418	96.9	500,768	89.8	256,568	95.5	6,811,754	96.3	1,591,531	4.28
3rd Quarter..	18,383,871	96.0	1,485,826	86.9	751,777	91.2	20,621,474	95.1	1,570,562	13.13
9 months	55,383,746	98.6	4,074,376	78.6	2,031,556	96.4	61,489,678	96.9	1,576,658	39.00
October	6,423,329	99.4	533,060	92.4	279,679	100.6	7,236,068	98.9	1,633,424	4.43
November	6,194,679	99.0	488,822	87.5	277,384	103.0	6,960,885	98.2	1,622,584	4.29
December	6,387,865	99.0	481,813	83.7	280,637	101.2	7,150,315	97.9	1,617,718	4.42
4th Quarter...	19,005,873	99.1	1,503,695	87.8	837,700	101.6	21,347,268	98.3	1,624,602	13.14
Total	74,389,619	98.8	5,578,071	80.9	2,869,256	97.9	82,836,946	97.3	1,588,741	52.14

Note—The percentages of capacity operated in the first 6 months are calculated on weekly capacities of 1,430,102 net tons open hearth, 134,187 net tons Bessemer and 49,603 net tons electric ingots and steel for castings, total 1,613,892 net tons; based on annual capacities as of Jan. 1, 1941, as follows: Open hearth 74,565,510 net tons, Bessemer 6,996,520 net tons, electric 2,586,320 net tons. Beginning July 1, 1941, the percentages of capacity operated are calculated on weekly capacities of 1,459,132 net tons open hearth, 130,292 net tons Bessemer and 62,761 net tons electric ingots and steel for castings, total 1,652,185 net tons; based on annual capacities as follows: Open hearth, 76,079,130 net tons, Bessemer 6,793,400 net tons, Electric 3,272,370 net tons.

YEAR 1942

Based on Reports by Companies which in 1941 made 98.5% of the Open Hearth, 100% of the Bessemer and 87.8% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,328,128	95.4	490,864	86.0	305,930	96.3	7,124,922	94.7	1,608,335	4.43
February	5,791,813	96.7	453,543	88.0	275,700	96.2	6,521,056	96.0	1,630,264	4.00
March	6,574,701	99.1	493,294	86.4	324,916	102.3	7,392,911	98.2	1,668,829	4.43
1st Quarter	18,694,642	97.0	1,437,701	86.7	906,546	98.3	21,038,889	96.3	1,635,994	12.86
April	6,346,707	98.8	454,583	82.2	321,023	104.4	7,122,313	97.7	1,660,213	4.29
May	6,600,376	99.5	454,054	79.5	332,460	104.7	7,386,890	98.2	1,667,470	4.43

Total

52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,498,029 net tons open hearth, 128,911 net tons Bessemer and 71,682 net tons electric ingots and steel for castings, total 1,698,622 net tons; based on annual capacities as of Jan. 1, 1942 as follows: Open hearth 78,107,260 net tons, Bessemer 6,721,400 net tons, electric 3,737,510 net tons.

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Baldwin Operating at Highest Level in History

Philadelphia

• • • Stepped-up production of tanks, guns, ship propellers and other war items has been a major factor in pushing the company's

over-all production figures to the highest level in its 111 years of history, according to Charles E. Brinley, president, the Baldwin Locomotive Works.

Although the difficult raw material situation has caused delays leading to some unevenness in pro-

ductive work, Baldwin expects its 1942 billings will be 50 per cent greater than in any recent year, Mr. Brinley stated, adding that the May billings of more than \$13,000,000 were exclusive of sales by The Midvale Co., a Baldwin associate.

PERSONALS . . .

• **Richard F. Bergmann** has been appointed chief engineer of the Link-Belt Co. with office at the company's executive headquarters in Chicago. **William W. Sayers**, who has served in this capacity since 1925, has been appointed consulting engineer. In this newly created position he will continue to deal with patent matters and will be available for consultation. Mr. Bergmann had been assistant to Mr. Sayers from 1933 to 1936, when he resigned to become chief engineer of Rayon Machinery Corp., Cleveland, from which position he now returns to Link-Belt.

• **W. H. Holcomb**, formerly vice-president and general manager of The Pelton Water Wheel Co., San Francisco, has been appointed assistant to the executive vice-president of the Baldwin Locomotive Works, Philadelphia. Mr. Holcomb started with The Pelton Water Wheel Co., a subsidiary of the Baldwin Locomotive Works, in December, 1919, as sales engineer. Later, he was successively manager of the pump department, sales manager, vice-president and sales manager and, since June, 1939, vice-president and general manager.



W. H. HOLCOMB, assistant to executive vice-president, Baldwin Locomotive Works, Philadelphia.



RICHARD F. BERGMANN, chief engineer, Link Belt Co., Chicago.

• **Harold Cope**, assistant general superintendent at Donora, Pa., Steel and Wire Works, American Steel & Wire Co., Cleveland, has been named division metallurgist at the company's offices in Cleveland, while **John A. Slenker**, whom Mr. Cope succeeds, has been named superintendent of the Steel Works in Worcester. **Loren J. Westhaver**, heretofore Steel Works superintendent at Worcester, has been transferred to Donora as assistant general superintendent of the Steel and Wire Works, replacing Mr. Cope.

• **E. S. Brett**, who from 1939 to 1942 has organized three aircraft factories in Canada, has joined Majestic Metal Specialties, Inc., Moosup, Conn., as aircraft manager. Mr. Brett had previously been associated with Pratt & Whitney, Chance-Vought, Consolidated Aircraft and Douglas Aircraft.

• **Hans Bohuslav** has joined the Sterling Engine Co., Buffalo, as vice-president in charge of engineering. Before going to the Sterling Engine Co., Mr. Bohuslav was associated with the Enterprise Engineering Co. of San Francisco. During his 10 years' stay he served first as chief engineer and

was later promoted to vice-president in charge of engineering.

• **Paul E. Chatelain** has been placed in charge of engineering development for the Wickman Corp., Detroit. Mr. Chatelain is engineer on special assignment for the A. C. Wickman Co., Ltd., of Coventry, England.

• **Howard E. Mills** has been named district sales manager of the midwestern territory of the Wickman Corp., Detroit, with headquarters in Chicago. From 1927 to 1941 Mr. Mills was associated in executive capacities with the National Automatic Tool Co., Richmond, Ind. For the past year he has been a member of the industrial staff of Cramer-Krasselt Co., Milwaukee.

• **J. D. McKnight** has been named manager of Allegheny Ludlum's Detroit district sales office. Formerly Assistant Manager in Detroit, Mr. McKnight has been associated with the Allegheny Ludlum Steel Corp. for the past six years, following his previous connection with the Murray Corp. of America, Detroit, in various plant and sales capacities.

• **E. E. Sanborn** has been appointed manager of tool steel sales in Allegheny Ludlum Steel Corp.'s Cleveland territory. Mr. Sanborn joined the sales department of the Atlas Steel Co. in 1924, and continued with the Ludlum Steel Co.



E. E. SANBORN, manager, Cleveland tool steel sales, Allegheny Ludlum Steel Corp.

when Atlas and Ludlum merged in 1929. He has been with Ludlum and later Allegheny Ludlum since that time, working in the Cleveland territory during the entire period.

- **C. F. Swank** has been appointed Cleveland district manager of Hiram Swank's Sons with offices in the Fidelity Building.

- **L. H. Chenoweth**, manager, manufacturers' sales, in the industrial products sales division of the B. F. Goodrich Co., Akron, Ohio, has been granted a leave of absence to serve on the Rubber Products Division of the War Production Board.

- **Henry E. Kingman** has been elected to the position of executive vice-president of Solar Aircraft Co., San Diego, Cal. Mr. Kingman, who has also been elected a director, goes to Solar from the Franklin Management Corp. of Boston, where he served as president. **Ray E. Craig**, formerly operating manager and comptroller of Barker Bros., Los Angeles, has been appointed as comptroller.

- **Benjamin T. Salmon** has been named chief engineer of Ryan Aeronautical Co., San Diego. **Miller T. Boyd** has been appointed chief development engineer and **Will C. Vandermeer** has been named chief project engineer. Salmon has had wide experience as a design engineer on some of the nation's foremost airplanes. For several years he was a project engineer with Glenn L. Martin Co. Previously he was for a number of years with Lockheed Aircraft Co. and was project engineer on the Lockheed P-38 pursuit plane. He also served with Northrup as design engineer and with Vultee.

- **William F. Bailey** has recently been appointed manager of the Porcelain Division, Westinghouse Electric & Mfg. Co., East Pittsburgh. Mr. Bailey, formerly auditor of the Switchgear Division at the Westinghouse East Pittsburgh works, takes charge of the Porcelain Department at a time when construction of two new buildings is underway to increase production by 30 per cent.

- **Clyde Jordan** was elected vice-president and manager of the line support division of Adel Precision Products Corp., San Diego, Cal. **J. E. Hughes** has been named resident manager of Adel Precision Products Corp.'s new engineering service office in Dallas, Tex. Mr. Hughes, who is a graduate in aeronautical engineering of Oxford University in England, has had a diversified aircraft manufacturing experience. Before joining Adel's engineering service department earlier this year, he was connected with Curtiss-Wright Corp., Bell Aircraft Corp., Republic Aviation Corp. and the Ford Motor Co.

- **V. I. Montenyohl**, vice-president of the B. F. Goodrich Co., Akron, Ohio, and a member of the organization for the past 35 years, has resigned because of his health. Except for two years spent with the company's New York district office, Mr. Montenyohl has worked from the Akron office during his entire business career. He was made assistant treasurer in March, 1920, and elected treasurer in 1927, serving in this capacity until 1940 when he was elected a vice-president. Since 1928 he has served as a director of the company and has directed the activities of the International B. F. Goodrich Corp., of which he was president.

- **Dr. Ellis E. Jensen**, executive director for Wisconsin of the National Conference of Christians and Jews for the past three years, has been employed as a research assistant in the industrial relations department of the Allis-Chalmers Mfg. Co. Dr. Jensen was an exchange fellow at the University of Berlin in 1931 and 1932. He received the degree of Doctor of Philosophy in 1939 from the University of Chicago.

- **Joseph G. Smith** has been appointed compliance co-ordinator for Pittsburgh Steel Co., Pittsburgh. Mr. Smith has been connected with Pittsburgh Steel in sales capacities for the past five years, and for the past two years has been assistant manager of the Pittsburgh district sales office.

- **S. F. Knight**, head of the Detroit office of Robins Conveying Belt Co., Passaic, N. J., has been placed in charge of the company's Cleveland office as well.

OBITUARY . . .

- **Hobart S. Johnson**, chairman of the board of directors and former president of Gisholt Machine Co., Madison, Wis., died May 28, aged 68 years. In failing health for a number of years, Mr. Johnson resigned the Gisholt presidency in 1940 and was succeeded by his son, George H. Johnson, who is present head of the firm and president of the National Machine Tool Builders' Association.

- **Thomas G. Dougall**, Chicago district sales manager for the Columbia Tool Steel Co., died June 9. Mr. Dougall had years of shop experience before becoming affiliated with Columbia, with whom he was connected for 16 years in charge of Chicago sales.

- **Charles George Roser**, secretary of Electro Metallurgical Sales Corp., a unit of Union Carbide & Carbon Corp, New York, died June 9, aged 55 years.

- **C. A. Hamilton**, president of the Alabama Pipe Co., of Anniston, Gadsden and Bessemer, Ala., died June 12 at Anniston. Mr. Hamilton started out as a day laborer in the pipe industry.

- **George Brick Smith**, cost engineer in the production department of the Newport News Shipbuilding and Dry Dock Co., died May 16, 1942, at Riverside hospital after two days' illness. He was 47 years old.

- **Boyd A. Musser**, president and manager of the Anthracite Bridge Co., died May 27 at Scranton, Pa.

- **John R. Kempf**, of the Detroit-Star Grinding Wheel Co., Detroit, Mich., died recently.

- **John P. Arnoldy**, president and general manager of Warman Steel Casting Co., died in Los Angeles, June 2. Mr. Arnoldy had been with the company since 1917, becoming secretary in 1923, general manager in 1925, and president in May, 1941.

More Changes Revealed in WPB Iron and Steel Branch

Washington

• • • Further reorganization of WPB's Iron and Steel Branch is under way and important initial changes in personnel were announced last week by Reese H. Taylor, Chief. It is reported that executive consultants whose activities have been of an advisory character will be given operating assignments.

Among consultants who, it is said, will be affected by this shift, are Joseph L. Block, Inland Steel Co.; G. C. Gries, Great Lakes Steel Corp.; Norman W. Foy, Republic Steel Corp.; C. H. Longfield, Youngstown Sheet & Tube Co. and A. V. Wiebel, Carnegie-Illinois Steel Corp. Added to Mr. Taylor's staff of executive consultants is H. Leroy Whitney, who has been a technical consultant on specifications. Another change in the Iron and Steel Branch personnel, it is reported, will be the selection of Oran Fulton, Wheelock, Lovejoy Co. Jobbers, as head of the Alloy Section, succeeding Maxwell Brace.

By changes announced, Charles Halcomb, former chief of the products section, was made chief of the allocations and priorities section, succeeding Stanley B. Adams, who was placed in charge of coordinating PD-25a information for the materials division. Later Mr. Adams will join the bureau of priorities of the division of industry operations. David Austin, executive consultant to the branch, was made chief of the products section.

Before joining the war effort in May, 1941, Mr. Adams was with the Dravo Corp., Pittsburgh. His previous experience included designing and engineering a large steel plant in the Ukraine for the Dnieprostoy Metal Works Russian Commission.

Mr. Halcomb, for the last 17 years Philadelphia district manager for the Proctor & Gamble Co., joined the government in 1941. His home town is Malvern, Pa.

Mr. Austin, vice-president in charge of sales for Carnegie-Illinois Steel Corp., Pittsburgh, came to Washington in January of this year.

New Douglas Aircraft Plant for Midwest

Chicago

• • • Construction of a new Douglas Aircraft Corp. plant in the greater Chicago area is expected to get underway immediately. This new plant, the fifth to be built by Douglas, will cost approximately \$20,000,000 and will employ 15,000 workers, according to the Chicago Association of Commerce.

Dry-Cleaning Fluids

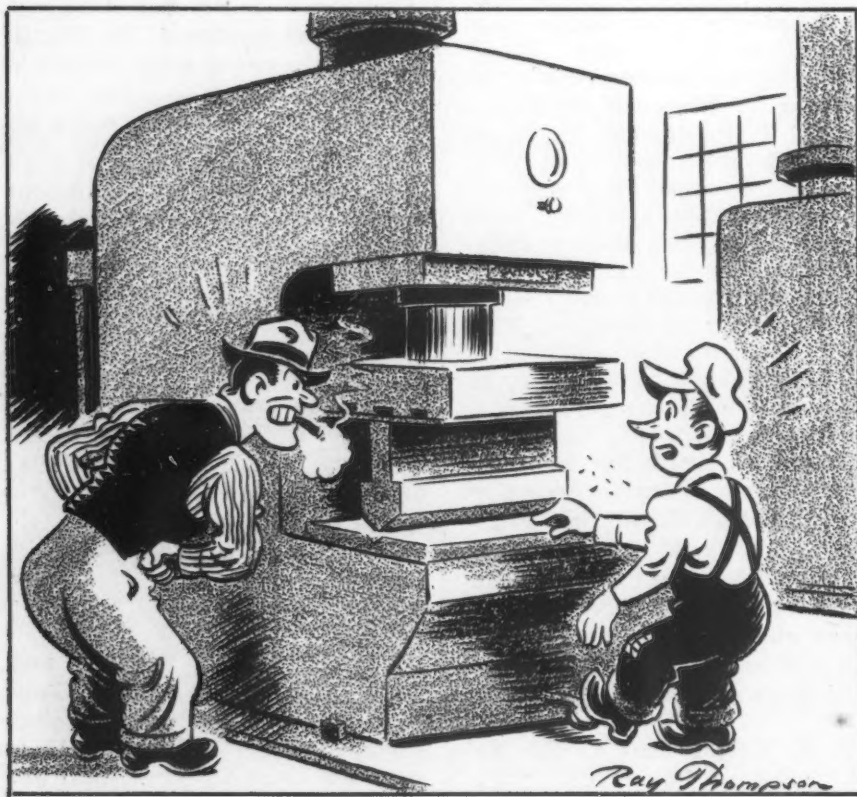
(CONCLUDED FROM PAGE 64)

handles per hr., 25-lb. metal beds, and 3000-lb. roller bearings for steel mills. This type bearing, 30 in. in diameter, formerly required 8 hrs. to clean, but the new cleanse reduces the time to 30 min.

Razor blades, gas meters, motor rotors, wired armatures, electrical switch connections, telephone parts, aluminum strip and foil for insulation, in fact virtually every metal part that can be named, has been cleaned quickly, efficiently, and thoroughly by solvent degreasing.

Eighty per cent of all degreasers are custom built, but retooling for metal cleaning is not necessary in plants converted from civilian to military goods. A degreaser which has been cleaning automobile hardware can with minor adjustments be assigned to cleanse small metal parts of military equipment. Sales of degreasers have jumped during the "defense" and "victory" years. Increased sales, however, do not indicate completely increased use of this method, for most units now are operated on a 16 or 24-hr. basis where formerly they may have been used intermittently during an 8-hr. day.

The victory program has placed a burden on manufacturers of degreasers and chlorinated solvents. Degreasers are being built as quickly as possible and only for military and essential civilian industries. Every ounce of solvent that possibly can be squeezed from current equipment and available supplies of chlorine is needed. Indeed, defense requirements for these solvents are far greater than the normal consumption in all civilian industries prior to the war. New equipment for manufacturing both chlorine and trichlorethylene is scheduled to come into production this year, and the trichlorethylene will be needed for degreasing as soon as it is ready.



"How many times have I told you
to cut your nails at home?"

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

Zinc and Copper

Output at New High

... Production of both copper and zinc reached new all-time highs during May. Crude copper output was 101,683 tons, and refined production was 98,632 tons, according to a report issued by the Copper Institute. Stocks of refined copper at refineries, on consignment and in exchange warehouses were off at the end of the month by 6406 tons to 77,383 tons, the institute stated, while deliveries to customers totaled 134,079 tons, an increase of almost 27,400 tons.

Zinc production amounted to 79,489 tons in May, according to data released by the American Zinc Institute. Average daily production remained almost constant, and the month's total output was up 2455 tons, accounted for by the extra day in May. This year's daily average of 2573 tons is more than 8 per cent above the 1941 average, and is over 100 per cent higher than the 1930-1941 average. Shipments, including domestic, export and drawback totaled 83,601 tons, a new record. Analysis of production by grades shows that while special high grade fell off by 1270 tons, there were increases of approximately 1800 and 1600 tons, respectively, in the ordinary high and intermediate grades.

A large producer of zinc recently sent a letter to zinc oxide and leaded zinc oxide customers stating that supplementary order M-11-a makes it unnecessary to file a PD-50 form with orders for lead-free and leaded zinc oxide. However, the company's letter points out that the new order, now effective, states that: "No producer shall ship zinc oxide or zinc dust to any person unless he has received from that person a written statement that such shipment will not result in an inventory of zinc oxide or zinc dust in excess of a minimum practical working inventory." The suggestion is made that the simplest means of complying with this order is by a statement on purchase orders.

Collapsible tube manufacturers will use about 750 tons of tin this year. This figure is based on a 10,000-ton lead allocation, plus the

ruling that tin content shall not exceed 7½ per cent per tube. The point is brought up here to correct any misunderstanding that might have arisen in connection with the statement on this page in the May 28 issue to the effect that this year's tube production is estimated at 12,000 tons. The figure will thus be closer to 11,000 tons, of which only 750 tons will be tin. Last year, some 5600 tons of tin went into collapsible tube manufacture.

The monthly average prices of the major non-ferrous metals during May were, in reality, the OPA ceiling prices set on those metals. These prices are as follows:

	Cents per Lb.
Electrolytic copper, Connecticut Valley	12.00
Lake copper, Eastern delivery	12.00
Straits Tin, spot, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65
Lead, St. Louis	6.35
Lead, New York	6.50

Aluminum Foundry for Plane Engines to Be Built in Ohio

Cleveland

... Construction was scheduled to start this week on a new \$3 million government-financed foundry that will be operated by the National Bronze & Aluminum Foundry Co. in this area.

The war plant will be known as the National Aluminum Cylinder Head Co., an affiliate of the National Bronze & Aluminum concern, and will provide employment for more than 1000 workers.

A company announcement approved by a Defense Plant Corp. representative said the project was sponsored by the War Production Board and sanctioned by the Defense Plant Corp. The foundry is scheduled for completion early next year and will produce aluminum castings for aircraft engines.

PERFORATED METAL

INDUSTRIAL and ORNAMENTAL

Any Metal • Any Perforation

● The uses for perforated metals are numerous and increasing. Industry requires it for a thousand purposes.

For ornamentation it provides beauty of design not otherwise obtainable. We offer a finished product, developed to fully meet the requirements you specify.

The
Harrington & King
PERFORATING CO.

5657 FILLMORE STREET—CHICAGO, ILL.
New York Office, 114 Liberty Street

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

Shift in Shell Sizes Causes Machine Tool Cancellations

Cleveland

••• Machine tool producers will have to begin reporting the "end use" for their shipments, just as the customers of steel plants will have to begin doing subsequent to June 30. However, this will not affect the status of the numerical preference list, but the reports will be used by the government to determine where various materials are going.

Although cancellations are expected as a result of the WPB's attempt to eliminate entirely or curtail construction of plants that will not be completed prior to mid-1943, no revoking of large orders for this reason has been indicated in this area thus far, so far as machine tool equipment is concerned. However, an interesting development has been the cancellation of three shell contracts for a certain size which had been placed in this area, for the reported reason that the government was seeking increased production of another type of shell. This has resulted in some large cancellations of machine tool orders, but a few of the contractors are attempting to determine whether or not they can adapt equipment for the size of shell being abandoned to turn out the shells now required.

Orders being placed for machine tools by the Ohio Crankshaft organization are being handled by Ohio Crankshaft, Inc., and not the Ohio Crankshaft Co.

Supply Meeting Demand

Cincinnati

••• That ordering of machine tools has definitely caught up with output is the general feeling of many manufacturers in this area who have been experiencing some substantial cancellations in recent weeks. Some of the cancellations, however, appear to have resulted from the abandonment of plans for plant expansion in some of the machine tool plants, as well as elsewhere. On the other hand, however, the trade generally indicates that new orders continue to come in to local plants and while the situation has not been completely analyzed, the general feeling is that new business is about balancing orders stricken from the books. Production schedules, however, have not been affected at all, since backlog of business will still carry the industry at its present high rate of production well into next year.

Employment problems continue to be the chief difficulty in the output situation. The draft has not yet affected the manpower situation seriously, since there has been

a pretty close cooperation between draft boards and personnel directors to leave essential men in the shops. New labor, however, that becomes available is almost immediately absorbed if there is some training or background.

Allis-Chalmers Book on Motors

Milwaukee

••• With war time demands requiring that electric motors be operated 168 hr. a week instead of 40 hr. as previously, maintenance engineers have been required to alter many of their ideas on motor care. To aid engineers in altering maintenance practice to accommodate today's needs, Allis-Chalmers Mfg. Co. has just published a new handbook entitled "A Guide to Wartime Care of Electric Motors." This book should be of particular value for training new men. Copies are available upon request to the company.

Thomas Machine Expands Plant

Pittsburgh

••• The Thomas Machine Manufacturing Co., builders of heavy machinery, are completing an addition to their plant at a cost of \$200,000, with buildings and machinery.

These additions will increase the company's capacity about 25 per cent.

Trade Notes

Whiting Corp., Harvey, Ill., has appointed the Moore Machinery Co., 1699 Van Ness Avenue, San Francisco, and the H. C. Donaldson Co., Los Angeles, its representatives in California, Arizona and Nevada.

The Leberfinger Tool & Die Co., Milwaukee, has been organized by John and Louis Leberfinger and Fred Kemnitzer with headquarters at 1537 W. Vliet Street.

The Tal Prestal Bender, Inc., has been organized by Edward T. Tal and Arthur Doyle, formerly with the American Radiator Co., to produce and market a new type hydraulic pipe bending machine. The new firm is housed with the Automatic Screw Machine Products Co., 4051 S. Iowa Avenue, Milwaukee.

H. Kasden & Sons, Inc., New Haven, Conn., has moved to a new plant at 2-44 Lloyd Street.

Pulverizing Machinery Co., formerly of Roselle Park, N. J., has moved to Chatham Road, Summit, N. J.

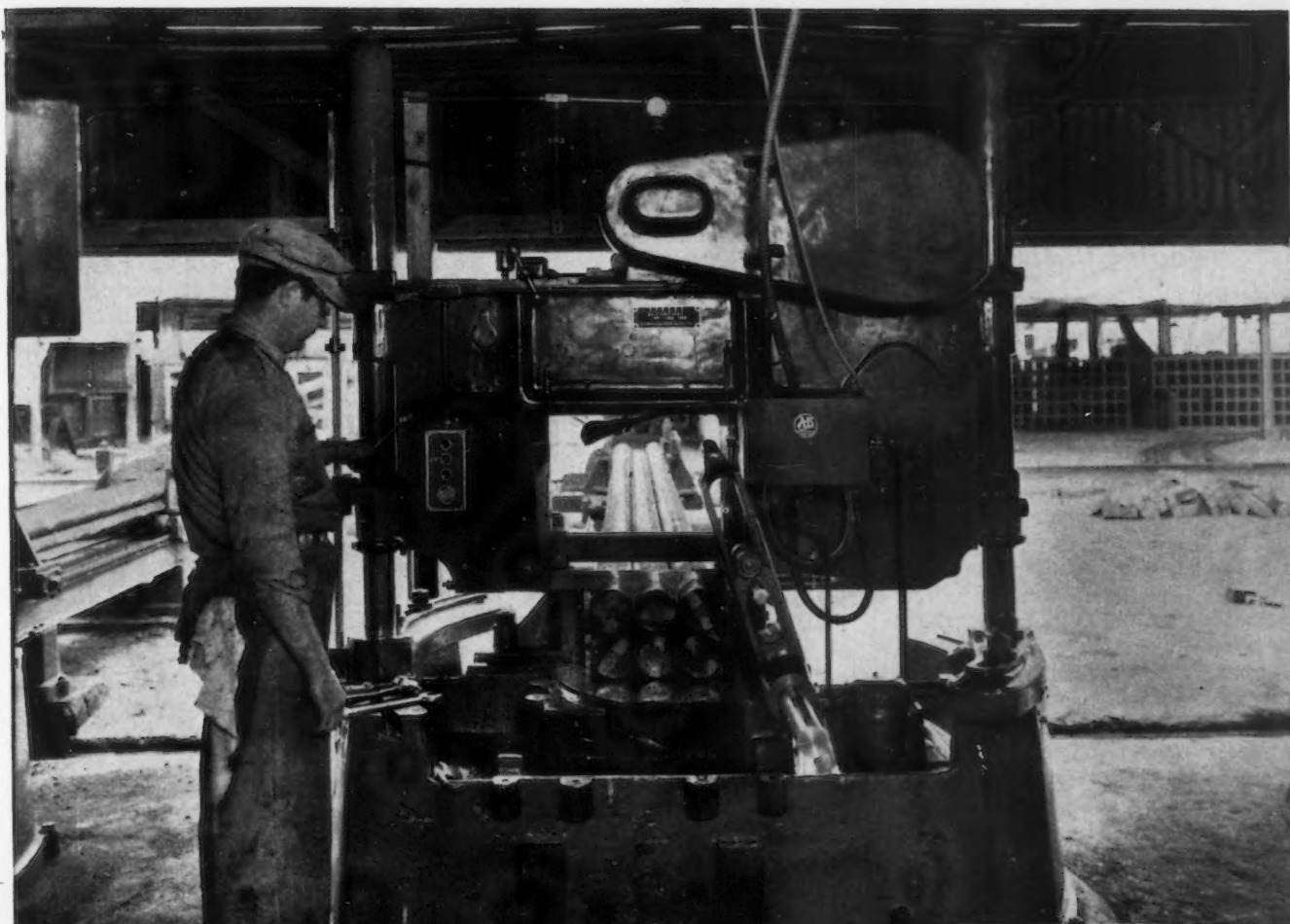
Super Electric Products Corp., Jersey City, and Greyhound Equipment Corp., Brooklyn, have consolidated and are operating as Super Electric Products Corp., 1057 Summit Avenue, Jersey City.

Drive-All Mfg. Co., Detroit, has opened a branch office in Chicago at 30 North LaSalle Street. Ralph Griffith is manager.

Iron & Steel Products, Inc., Chicago, has appointed Negociacion Tecnica Industrial, S.A., 5 de Febrero 123, Mexico, D.F., its representative in Mexico.

Gisholt Machine Co., Madison, Wis., has announced the establishment of a branch office in Pittsburgh, at 1124 Park Building, to serve its customers in the Southeastern Ohio, West Virginia, Western Pennsylvania, and Western Maryland areas. W. L. Sutherland will be in charge of the new office, handling negotiations on the complete line of Gisholt turret lathes, automatic lathes and balancing machines.

Water Treatment Co. of America, Pittsburgh, sales and service facilities are being broadened through a distributorship arrangement with American Radiator & Standard Sanitary Corp. branches blanketing this territory. The firm's method of water conditioning for boilers, condensers, etc., known as the Technical System, will be sold and serviced by American Radiator and Standard Sanitary Corp.'s branches.



MARVEL SAWS

Cut anything that will go between the jaws

This is one of five No. 18 MARVEL Giant Hydraulic Hack Saws used by a well known Texas tool company to cut-off "multiple bars of alloy steel in round, square, and flat shapes, up to the maximum capacity of the large work-throat (18" x 18")".

These super hack saws are designed for the largest sizes, and toughest steels—up to 18" x 18". After a year's heavy duty service, when asked as to the effectiveness of these saws in solving the cutting-off problems at this plant, the mechanical engineer in charge reported them "very effective."

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago, U. S. A.
Eastern Sales Office: 225 Lafayette St., New York

No. 9A
Automatic
Bar Feed
Cap. 10" x 10"

No. 8
Metal
Band Saw
Cap. 18" x 18"

No. 18
Giant
Hydraulic
Cap.
18" x 18"

No. 1
Cap. 4" x 4"

No. 2
Cap. 8" x 8"

No. 4B
Light - Duty
High Speed
Cap. 6" x 6"

No. 6
Heavy-Duty
High Speed
Cap. 6" x 6"

No. 6A
Automatic
Bar Feed
Cap. 6" x 6"

No. 9
Heavy-Duty
High Speed
Cap. 10" x 10"

SCRAP

... MARKET ACTIVITIES AND QUOTATION TRENDS

Scrap Supplies Ease, Boding Ill for Winter

Pittsburgh

... Anxiety in scrap and steel circles is mounting rapidly as signs begin to multiply that scrap collections and loadings are falling off from the level of a month ago. This is considered to be especially serious in view of the need for accumulations at consumers plants in order to tide them over winter months when collections are down substantially.

Observers here believe that three major factors are beginning to operate in the scrap picture, which is resulting in a spectre of shortages becoming more pronounced after a period of seemingly easier scrap flow.

The vigilance of the OPA and the numerous court cases in which OPA has sought injunctions is

believed to be the prime reason for exceptionally high rejections by steel mills and brokers. No one in the scrap business today is willing to take the slightest chance of running afoul of OPA regulations, and, as a result, all are bending over backwards in the inspection of incoming cars. With rejections running high, mills are not only "out" the scrap, but cars must be returned to the point of loading, unloaded and resorted, which all takes time, holds up the shipment of acceptable scrap, and ties up freight cars.

Secondly, many auto graveyards are being cleaned up rapidly and the number of old cars reaching graveyards is falling off. Many graveyard dealers are fearful of taking in old cars at the prices asked for by the owner since they believe that the government may at any time take over such material on the basis of scrap return

value. It is said that graveyard dealers can ill afford to pay out \$25 to \$100 for old cars and then run the chance of having these commandeered at a much lower figure. Hence, graveyards being cleared are not filling up again.

Thirdly, many local scrap drives are completed and this material is

How executives can assist the drive for more scrap is outlined in this week's editorial by J. H. Van Deventer, page 39. The Washington column discusses the government's threat to request direct scrap dealing by steel mills.

not recurring. Such scrap represents many years' accumulations in homes. Furthermore, it is said in some circles that the grade of scrap being collected in some drives is so inferior that extensive sorting must be done to make it acceptable to the mills. This takes time, and, in some cases, the scrap even then is not acceptable due to the lightness or mixture with items that are not being taken in by the mills.


WHAT CONSTITUTES GOOD SPRINGMAKING PRACTICE?



Of all the factors that are involved in springmaking, by far the largest slice is contributed by *experience*. Before you make hard-and-fast specifications for springs, let Dunbar experience analyze your requirements. It has often paid off in the form of simplified design, savings, and better performance. *In our experience, nothing can take the place of experience.*

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"Quality Springs Since 1845"



Harvester's Farm Collection Nets Over Million Tons

... The International Harvester Co. states that 1,367,000 net tons of scrap metal were collected in three months from farms and small towns in a country-wide campaign sponsored by the company and carried on through its 8,500 farm-equipment dealers. The collection was equal to 35,000 railroad carloads.

Fowler McCormick, president of Harvester, said that in most towns the collection was made a community project, with many organizations cooperating. He said the company would continue the program, working in the future under the joint auspices of the Farm Equipment Institute and the National Retail Farm Equipment Association.

o o o

PHILADELPHIA—Shipments to mills are falling off due to the tighter grading rules, though most plants have built up small inventories. Reports by 1200 firms participating in the industrial salvage drive in the area including Maryland, Delaware, southern New Jersey and eastern Pennsylvania indicated collection of more than 286,000 tons of iron and steel scrap during May. Exactly how

much of this would have been moved without the impetus of the drive can not be determined.

PITTSBURGH—Scrap collections and loadings have dropped off here recently and this situation is already beginning to affect mill receipts. Another factor causing worry among steel operators is the necessity for rejecting large numbers of cars of scrap, although some sources believe that this situation is due to over-zealousness engendered by OPA activity in the form of inspections and court injunctions.

CHICAGO—While the flow of scrap in this district is sufficient to support steel making schedules in excess of 100 per cent of capacity, the outlook for the winter months is still decidedly pessimistic.

BUFFALO—Householders are saving tin cans as requested, but the city claims no funds are available for special collections and is looking to the government for financial assistance in this regard. The district's largest scrap consumer has registered dissatisfaction with the sluggish rate at which old auto scrap is moving, but the government is reluctant to take the drastic steps threatened two months ago as long as the graveyard operators apparently are moving the metal as fast as they are able. Another lake boat with 5000 tons of scrap arrived in port last weekend from the Duluth area.

BOSTON—Lack of freight cars and competent yard labor is hindering movement of scrap. The New Haven and Boston & Albany roads have explicit instructions to return cars to connecting lines as soon as empty. Result, cars go back empty. Burners are impossible to obtain, jobs in shipyards being far more remunerative than yard pay, and only "lame duck" common labor is available. Movement of scrap has by no means been checked, however.

ST. LOUIS—Although operations in the steel mills of this district have not yet been affected, the past week saw a sharp falling off in the flow of scrap into these plants. Heavy rains in the collection areas have slowed up shipments. Automobile graveyards in Missouri produced 5546 tons of scrap in May, an increase of nearly 180 per cent over April's production.

CINCINNATI—Recent reported remarks of the President that scrap is backing up in dealers' yards and mills will probably have to accept unprepared scrap sent district dealers on a survey of local yards to determine whether any material was backing up. The check, however, failed to reveal any appreciable backlog and dealers generally report that all scrap is prepared and shipped almost immediately upon receipt at dealers' yards. The situation generally, however, appears to be a trifle easier and the mills are attempting to build up a backlog against the fall and winter. One mill interest in the district indicates that its available scrap is better than twice the inventory of two months ago, but that it is still less than 50 per cent of the amount of a year ago.

Alloy Steel Output Rises to One in Every 10 Tons of Steel

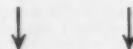
••• One out of every ten tons of steel produced in the United States last year was alloy steel, the highest proportion of alloy steels ever recorded.

Nearly 8,175,000 tons of alloy steel ingots and castings were produced during the year, according to the American Iron and Steel Institute. That total was almost 65 per cent more than the best previous year's output of 4,966,000 tons in 1940, and was 85 per cent more than was produced in 1929, the best peacetime year for alloy steels.

The statistics for 1941 show that alloy steels represented 9.9 per cent of the total tonnage of steel produced.

Preliminary figures indicate that under the current great demand for fine steels for war materials, production of high grade alloy steels is running at the rate of over 9,000,000 tons for the year

—which would be more than twice as much as was required in the nation's biggest year of peacetime demand for steel.



U. S. Steel Shipments in May Highest This Year

••• Shipments of finished steel products by subsidiary companies of the United States Steel Corp. for the month of May were 1,834,127 net tons, highest for any month this year and third highest in the Corporation's history.

The May shipments compare with 1,758,894 net tons in the preceding month, April, an increase of 75,233 net tons; and with 1,745,295 net tons in May, 1941, an increase of 88,832 net tons.

For the year 1942 to date, shipments were 8,729,439 net tons compared with 8,384,240 net tons in the comparable period of 1941, an increase of 345,199 net tons.

30% WELDING TIME SAVED— Says one Ransome owner.*

An average welding time-saving of 30% in the first year of operation has been reported by the owner of the Ransome Positioner illustrated below.

Ransome Welding Positioners

save time, the most important factor in Victory Production. Investigate the possibilities for stepping-up your own welding production. Write for Bulletin 201.



* On file.

**INDUSTRIAL DIVISION
RANSOME CONCRETE
MACHINERY COMPANY
Dunellen New Jersey**

SCRAP PRICES

(All the prices given below are per gross tons and are basing point prices from which shipping point prices and consumer's delivered prices are to be computed)

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Com- pressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)			BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)			ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
	Machine Shop Turnings			Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap			Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles	
				Billet, Bloom, Forge Crops	Bar Crops and Smaller	Punch- ings and Plate	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under				
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton.....	\$20.00	\$16.00	\$16.00	\$25.00	\$22.50	\$22.50	\$21.00	\$21.50	\$22.00	\$20.00	\$20.50	\$21.00	\$18.00	\$19.50	\$21.00	
Cleveland, Middletown, Cincinnati, Portsmouth.....	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50	
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt....	18.75	14.75	14.75	23.75	21.25	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75	
Ashland, Ky.....	19.50	15.50	15.50	24.50	22.00	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50	
Buffalo, N. Y.....	19.25	15.25	15.25	24.25	21.75	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25	
Bethlehem, Pa.; Kokomo, Ind..	18.25	14.25	14.25	23.25	20.75	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25	
Duluth, Minn.....	18.00	14.00	14.00	23.00	20.50	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00	
Detroit, Mich.....	17.85	13.85	13.85	22.85	20.35	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85	
Toledo, Ohio.....	17.50	13.85	13.85	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50	
St. Louis, Mo.....	17.50	13.50	13.50	22.50	20.00	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50	
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00	
Minneapolis, Colo.....	16.50	12.50	12.50	21.50	19.00	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50	
Seattle, Wash.....	14.50	10.50	10.50	19.50	17.00	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50	
Portland, Ore.....					15.50	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00	

BUNDLES consisting exclusively of tin coated material and compressed into charging box size, are \$4 per gross ton below No. 2 dealers' bundles. Bundles containing tin coated material but not composed exclusively of such material (outlawed by order M-24-b) are \$8 below No. 2 dealers' bundles.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Published dock charges prevail, or if unpublished 75c. per ton must be included as part of the deduction.* Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus lowest switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

*At Memphis deduct 50c.; Great Lakes ports \$1; New England \$1.25.

REMOTE SCRAP: Defined as all grades of scrap listed in table above located in North Dakota, South Dakota, Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. The delivered price of remote scrap may exceed by more than \$1, but not more than \$5, the price at the basing point nearest the consumer's plant, provided detailed statement under oath is furnished OPA. Where delivered price would exceed by more than \$5 the price at basing point nearest consumer, user must apply to OPA for permission to absorb the additional charges. For exceptions see official order.

UNPREPARED SCRAP: The maximum prices established hereinabove are maximum prices for prepared scrap. For unprepared scrap, maximum prices shall be \$2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge \$2.50 per ton on consumer-owned unprepared remote scrap (see order).

Where more than one grade of scrap is included in a shipment, the maximum price of all scrap in the vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CAST IRON BORINGS: (No more than 0.5 per cent oil content; for chemical use), add \$5 to price of cast iron borings.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of \$2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA, of the shipping point, transportation charges and details of the sale.

RAILROAD SCRAP

(Per gross ton, delivered consumers' plants located on line.)

	Scrap Rails			Scrap Rails		
	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	3 ft. and Under	2 ft. and Under	18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown.....	\$20.50	\$21.50	\$23.00	\$23.50	\$23.75	\$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown....	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco.....	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo.....	18.00	19.00	20.50	21.00	21.25	21.50
Detroit.....	20.25	21.25	22.75	23.25	23.50	23.75
Duluth.....	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.....	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.....	17.00	18.00	19.50	20.00	20.25	20.50
Seattle.....	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis.....	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

Other Than Railroad Scrap

	Group A	Group B	Group C
No. 1 machinery cast, drop broken, 150 lbs.			
No. 1 cupola cast.....	\$18.00	\$19.00	\$20.00
and under.....	18.00	19.00	20.00
Clean auto cast.....	18.00	19.00	20.00
Unstripped motor blocks.....	17.50	18.50	19.50
Stove Plate.....	17.00	18.00	19.00
Heavy Breakable Cast.....	15.50	16.50	17.50
Charging box size cast.....	17.00	18.00	19.00
Misc. Malleable.....	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ..	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00

Wire and Wire Products: (Cents Per Lb.)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Wire rods	2.00	2.00	2.00	2.00
Skelp (grv'd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
No. 3 fdy., Philadelphia...	\$25.89	\$25.89	\$25.89	\$25.84
No. 2, Valley furnace....	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti...	24.68	24.68	24.68	24.06
No. 2, Birmingham.....	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†.	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa...	25.39	25.39	25.39	25.34
Basic, Valley furnace....	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	31.34
Ferromanganese†	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Heavy melting steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh...	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia..	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go.....	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$6.125
Foundry coke, prompt ..	6.875	6.875	6.875	6.875

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	June 16, 1942	June 9, 1942	May 19, 1942	June 17, 1941
Copper, electro., Conn...	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	52.375
Zinc, East St. Louis....	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 129 to 138 herein.

Composite Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
June 16, 1942.....	2.30467c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One week ago	2.30467c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One month ago	2.30467c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One year ago	2.30467c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1942.....	2.30467c.,	2.30467c.,	\$23.61	\$23.61	\$19.17	\$19.17
1941.....	2.30467c.,	2.30467c.,				
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1939.....	2.35367c., Jan. 3	2.26689c., May 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1933.....	1.95578c., Oct. 3	1.75836c., May 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1932.....	1.89196c., July 5	1.83901c., Mar. 1	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1929.....	2.31773c., May 28	2.26498c., Oct. 29	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
			18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													10 DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes ²	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			13 4.05¢			3.39¢
TERNES, M'FG.															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢ 14			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢ 14	2.27¢	2.40¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton = 2.70¢)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
								(Coatesville and Claymont = 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ⁽¹¹⁾		2.47¢	2.65¢	2.27¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢					(Coatesville = 3.50¢)				3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Worcester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Worcester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Worcester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Worcester = 8.55¢)							
WIRE⁹															
Bright ¹⁰	2.60¢	2.60¢		2.60¢	2.60¢			(Worcester = 2.70¢)				3.10¢			2.94¢
Galvanized															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢				(Worcester = 3.30¢)				3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS¹¹															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ These prices do not apply if the customary means of transportation (rail and water) are not used. ¹¹ Ship plates only. ¹² Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. ¹³ Boxed. ¹⁴ Portland and Seattle price, San Francisco price is 2.50c. ¹⁵ This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.



IT'S A GREAT SHEET FOR PAINTING

NEW
CONTINENTAL
Lead-Sealed
SHEETS



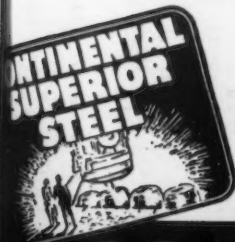
Sales of Continental LEAD-SEALED are governed by priority restrictions. However, we will be glad to furnish further information and samples of this revolutionary new sheet on request.

Here's a new steel sheet with definite advantages for manufacturers. For one thing, Continental's new LEAD-SEALED takes and holds paint without preparatory treatment. Because it carries a lead coating applied by a new process developed by Continental, this new sheet provides a painting surface far superior to galvanized sheets.

But LEAD-SEALED has other important advantages: Its lead coating does not fracture or peel in forming operations. The sheet is softer and more ductile because the coating reaction with the base metal does not stiffen it. It solders easily without flux or acid. Its lead coating serves as a lubricant in die forming.

Because of these qualities, Continental LEAD-SEALED is well adapted for a wide range of manufactured products where galvanized sheets formerly were used.

CONTINENTAL STEEL CORPORATION, Kokomo, Indiana
 (Plants at Canton, Kokomo, Indianapolis)



SUPERIOR

CONTINENTAL STEEL CORPORATION

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2.25 higher; f.o.b. Duluth, billets only, \$2 higher.

	Per Gross Ton
Rerolling	\$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00
Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.	
Prices delivered Detroit are \$2.25 higher.	

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	\$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared ..	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	Per Lb.
Pittsburgh, Chicago, Cleveland ...	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe) Base Price—\$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	\$25.53	\$25.03	\$26.53	\$26.03		
Brooklyn	27.65			28.15		
Jersey City	26.62	26.12	27.62	27.12		
Philadelphia	25.89	25.39	26.89	26.39		
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass.††	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.	25.00	24.50	26.00	25.50	\$29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50	26.00	25.50		
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.68	24.68		25.18		
Canton, Ohio	25.47	24.97	25.97	25.47		
Mansfield, Ohio	26.06	25.56	26.56	26.06		
St. Louis	24.50	24.00				\$31.34
Chicago	24.00	23.50	24.50	24.00		
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50	24.50	24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown†	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						\$28.00
Lyles, Tenn. fc.†						33.00
St. Paul	26.76		27.26	26.76		
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	27.25					
San Francisco	27.25					
Seattle	27.25					
Provo, Utah	22.00					
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON: Valley or Pittsburgh furnace

*Pittsburgh Coke & Iron Co. (Sharpville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace. ††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at \$1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago. \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle.

FUEL OIL

No. 3 f.o.b. Bayonne, N. J.	5.20c.
No. 6 f.o.b. Bayonne, N. J.	4.285c.
No. 6 Bur. Std., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	\$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	\$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern) ..	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	\$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

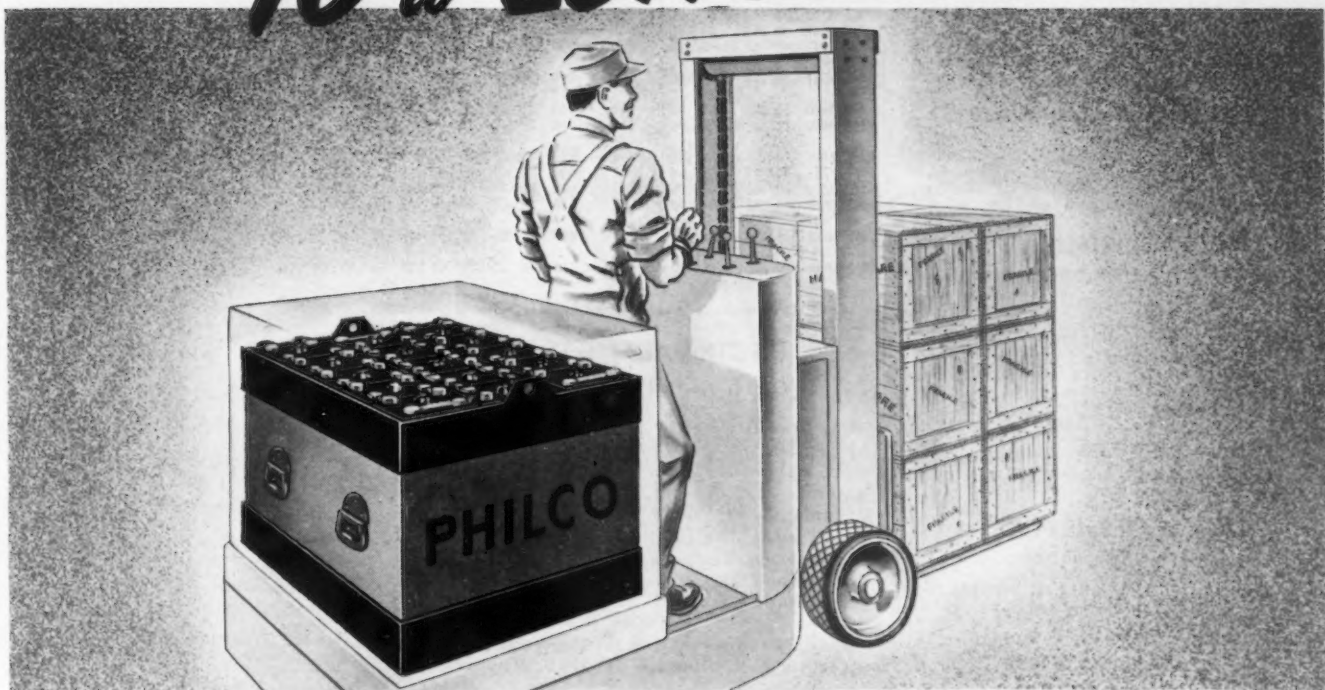
Standard f.o.b. Baltimore and Chester	\$76.00
Chemically bonded, f.o.b. Baltimore ..	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	\$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

WITH PHILCO XL BATTERIES IN YOUR TRUCKS

**EVERY CHARGE LASTS
10% LONGER!**



**10% GREATER CAPACITY...SUSTAINED
HIGH VOLTAGE...LONGER LIFE!**

Powered with Philco XL Storage Batteries, your Industrial Trucks can be worked 10% longer between charges! Philco oversize grids and Philco engineering developments give you a battery with 10% greater capacity!

Only in a Philco do you get flint-hard, "K" Process plates for high capacity and sustained voltage . . .

Philco Triple Insulation for long productive life . . . rugged Philco construction for minimum maintenance costs. These technical advances have grown out of Philco's fifty years of practical battery experience.

Now, with production facilities tripled, Philco Storage Batteries can be delivered in half the time that is current practice in the industry!

Write today for the new Philco Industrial Truck Battery Catalog. Philco Storage Battery Division, Dept. I, Trenton, N. J.

**PHILCO
STORAGE
BATTERIES**



PHILCO'S NEW
TRENTON, N. J.,
PLANT HAS
TRIPLED PRO-
DUCTION FACIL-
ITIES OF PHILCO
STORAGE BATTERIES

PRICES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57 1/2 c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT										Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulfur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium		Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35			.10/.20			.45c	\$ 9.00	.95c	\$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35			.25/.35			.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35			.10/.20			.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35			.10/.20			.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35			.20/.30			.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35			.30/.40			.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35			.30/.40			.90	18.00	1.40	28.00
NE 8547	.43/.50	1.39/1.60	.040	.040	.20/.35			.40/.60			1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25			.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25			.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30			.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30			.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30			.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30			.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40			.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40			1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c, major basing points.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cutnails, carloads	3.85
Base per 100 Lb.	
Annealed fence wire	\$3.05
Annealed galvanized fence wire	3.40
Base Column	
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barless wire	70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities. Note: Birmingham base same on above items, except spring wire.

WAREHOUSE PRICES (Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS		STRIP			Plates (1/4 in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	\$3.35		\$4.65	\$3.60	\$3.20	\$3.40	\$3.40	\$3.35	\$3.65	\$7.45	\$5.75	\$8.40	\$6.75
Chicago	3.25	4.10	4.85 ¹	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05 ⁵	5.05	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.68	4.60 ²	5.00	3.96 ⁶	3.61	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84 ¹	3.68 ⁶	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30 ¹	4.75 ⁴	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45 ³		4.75 ¹	3.70 ³		3.55 ³	3.55 ³	3.50 ³	4.48				
St. Louis	3.39	4.24 ²	4.99 ¹	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23 ²	4.98 ¹	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	4.90 ⁵	5.05	4.00		3.70	3.70	3.85	4.04				
Cincinnati	3.42	4.37 ²	4.42 ¹	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85		5.40	4.10		4.05	4.05	4.00	4.15				
Washington	3.60			4.10		3.80	3.80	3.95	4.10				
Indianapolis	3.45	4.25	5.01 ¹	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	5.32	5.52 ¹	4.20		4.15	4.15	4.10	4.42				
Memphis	3.85		5.25	4.10		3.95	3.95	3.90	4.31				
New Orleans	4.05			4.30		3.90	3.90	4.10	4.60				
Houston	4.00		5.25	4.30		4.05	4.05	3.75					
Los Angeles	4.95	7.15	5.95	4.90		4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco	4.55	6.40	6.10 ⁷	4.50		4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle	4.65 ⁷	7.60	5.70 ⁷	4.25		4.75	4.45	4.20	5.75		8.00		

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: ¹ 500 to 1499 lb. ² 400 to 1499 lb. ³ 400 to 3999 lb. ⁴ 450 to 1499 lb. ⁵ 1000 to 1999 lb. ⁶ 0 to 1999 lb. ⁷ 300 to 10,000 lb. At Philadelphia, galvanized sheets, one to nine bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, \$3.43. † Los Angeles prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

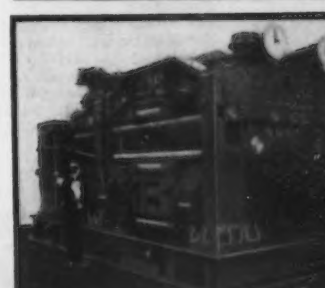
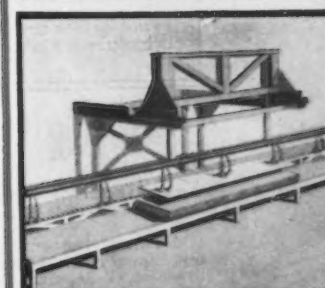
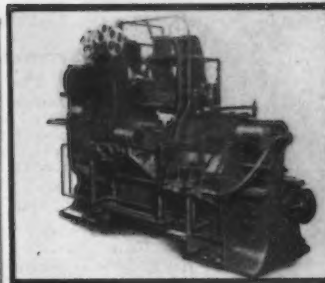
WEAN

STEEL MILL * Equipment *

PRODUCTS •

Continuous Strip Coiling Equipment.
Special Conveying Mechanism.
Automatic Pilers.
Uncoiling Units.
Press Feeding Equipment.
Slitters.
Strip Uncoiling and Automatic Shearing Units.
Strip Coil Holders.
Strip Coiling Reels.
Sheet Galvanizing Equipment.
Automatic Tinning Equipment.
Automatic Doublers.
Normalizing Furnaces.
McKay Levellers and Processing Units.
Strip Welding Equipment.
Continuous Strip Pickling Equipment including: Uncoilers, Up-Cut Shears, Stitching Machines, Pinch Roll Units, Recoilers, Drying Machines, Pickling Tanks, and Auxiliary Equipment.
Scrubbing, Leveling and Oiling Machines for Flat Products.
Wilson Vertical Tube Type Annealing Furnaces.
Corrugated Inner Covers.
Automatic Feeding and Catching Tables.
Continuous Pack and Pair Heating Furnaces.
Wheelabrator Abrasive Cleaning Equipment.
Automatic Weight Classifier.
Automatic Gauge Classifier.
Shell Lathes.
Airplane Motor Sleeve Lathes.
Armor Plate Levellers.
Vacuum Cup Lifters.

For
WAR
Purposes



Associated Companies

Lee Wilson Engineering Co.
CLEVELAND, O.

The McKay Machine Co.
YOUNGSTOWN, O.

Flinn & Dreffeln Co.
CHICAGO, ILL.

The Wellman Smith Owen Engr.
Corp., Ltd.
LONDON, ENGLAND

The Hallden Machine Co.
THOMASTON, CONN.

The Wean Engineering Co.
of Canada, Ltd.
HAMILTON, ONT.

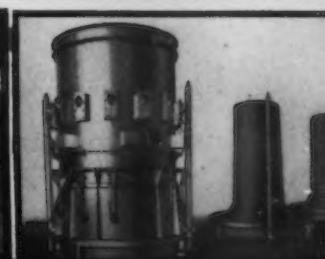
SPECIALISTS IN SHEET, TIN and STRIP MILL EQUIPMENT

The
WEAN

ENGINEERING CO., INC.

WARREN, OHIO
SUBSIDIARY COMPANY

THE BRODEN CONSTRUCTION CO., CLEVELAND, O.
Mfgs. of Strip and Wire Mill Machinery



PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)\$135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%\$36.00
Domestic, 26 to 28% 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)\$74.50
50% (ton lots, packed) 87.00
75% (carload lots, bulk)135.00
75% (ton lots, packed)151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio\$29.50*
Buffalo 30.75*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon13.00c.
2 carbon19.50c.
1 carbon20.50c.
0.10 carbon22.50c.
0.06 carbon23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon\$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained

W, del'd carload \$2.00

Ferrotungsten, 100 lb. and less... 2.25

ferrovanadium, contract, per lb. contained V, del'd\$2.70 to \$2.90†

Ferrocolumbium, per lb. contained

Cb, f.o.b. Niagara Falls, N. Y., ton lots\$2.25†

Ferrocobaltititanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton\$142.50

Ferrocobaltititanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton\$157.50

Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton. \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton\$75.00

Ferromolybdenum, per lb., Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo., f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50\$4.75

Old range, non-bessemer, 51.50 4.60

Mesaba, bessemer, 51.50 4.60

Mesaba, non-bessemer, 51.50 4.45

High phosphorus, 51.50 4.35

Foreign Ores*

(C.I.F. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, 46-48 Mn66.5c. to 68c.

Indian, 48-50 Mn68c. to 70c.

Brazilian, 46-48 Mn 67c. to 68c.

Cuban, 51 Mn \$1c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered\$24 to \$26

Tungsten, domestic scheelite, at mine\$24 to \$25

Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade) \$28

Rhodesian, 45Nom.

Rhodesian, 48Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago\$12.25

By-product, New England\$13.75

By-product, Newark\$12.49 to \$12.95

By-product, Philadelphia\$12.38

By-product, Cleveland\$12.30

By-product, Cincinnati\$11.75

By-product, Birmingham\$8.50†

By-product, St. Louis\$12.02

By-product, Buffalo\$12.50

BOILER TUBES

Seamless Steel and Lap Weld Commercial

Boiler Tubes and Locomotive Tubes

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

Seamless Lap Weld, Cold Hot Hot

Drawn Rolled \$ \$ \$

2 in. o.d. 13 B.W.G. 15.03 13.04 12.38

2½ in. o.d. 12 B.W.G. 20.21 17.54 16.58

3 in. o.d. 12 B.W.G. 22.48 19.50 18.35

3½ in. o.d. 11 B.W.G. 28.37 24.62 23.15

4 in. o.d. 10 B.W.G. 35.20 30.54 28.66

(Extras for less carload quantities)

40,000 lb. or ft. overBase

30,000 lb. or ft. to 39,999 lb. or ft. 5%

20,000 lb. or ft. to 29,999 lb. or ft. 10%

10,000 lb. or ft. to 19,999 lb. or ft. 20%

5,000 lb. or ft. to 9,999 lb. or ft. 30%

2,000 lb. or ft. to 4,999 lb. or ft. 45%

Under 2,000 lb. or ft. 65%

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

6½ in., shorter and smaller65½

6 x ¾ in., and shorter63½

6 in. by ¾ to 1 in. and shorter... 61

1½ in. and larger, all length.....59

All diameters over 6 in. long.....59

Lag, all sizes62

Plow bolts65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller62

9/16 to 1 in. inclusive59

1½ to 1½ in. inclusive57

1½ in. and larger56

On above bolts and nuts, excepting

plow bolts, additional allowance of 10

per cent for full container quantities.

There is an additional 5 per cent allow-

ance for carload shipments.

Semi-Fin. Hexagon Nuts

U.S.S. S.A.E.

7/16 in. and smaller 64

½ in. and smaller 62

½ in. through 1 in. 60

9/16 to 1 in. 59

1½ in. through 1½ in. 57

1½ in. and larger 56

In full container lots, 10 per cent addi-

tional discount.

Stove bolts, packages, nuts loose

71 and 10

Stove bolts in packages, with nuts

attached 71

Stove bolts in bulk 80

On stove bolts freight allowed up to

65c. per 100 lb. based on Cleveland, Chi-

cago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chi-

cago, Birmingham\$3.75

Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chi-

cago, Birmingham65 and 5

Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or

S.A.E. thread, 1 in. and smaller... 60

Upset set screws, cup and oval

points 68

Milled studs 40

Flat head cap screws, listed sizes... 30

Flister head cap, listed sizes 46

Freight allowed up to 65c. per 100 lb.

based on Cleveland, Chicago or New York

on lots of 200 lb. or over.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,

gross ton\$40.00

Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets)\$40.00

Light rails (from rail steel) 39.00

Base per Lb.

Cut spikes3.90c.

Screw spikes5.15c.

Tie plates, steel2.15c.

Tie plates, Pacific Coast2.30c.

Track bolts4.75c.

Track bolts, heat treated, to rail-

roads5.00c.

Track bolts, jobbers discount63-5

Basing Points, light rails—Pittsburgh,

Chicago, Birmingham; spikes and tie

plates—Pittsburgh, Chicago, Portsmouth,

Ohio, Weirton, W. Va., St. Louis, Kansas

City, Minnequa, Colo., Birmingham and

Pacific Coast ports; tie plates alone—

Steelton, Pa., Buffalo; spikes alone—

Youngstown, Lebanon, Pa., Richmond.

FLUORSPAR

Fire Clay Brick Per Net Ton

Domestic washed gravel, 85-5 f.o.b.

Kentucky and Illinois mines, all

rail\$25.00

Domestic, f.o.b. Ohio River landing

barges 25.00

No. 2 lump, 85-5 f.o.b. Kentucky

and Illinois mines 25.00

Foreign, 85% calcium fluoride, not

over 5% Cl, c.i.f. Atlantic ports,

duty paidNominal

Domestic No. 1 ground bulk, 95 to

98%, calcium fluoride, not over

2½% silicon, f.o.b. Illinois and

Kentucky mines\$34.00

As above, in bags, f.o.b. same

mines 36.40